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THE WALTER AND ELIZA HALL INSTITUTE OF RESEARCH IN PATHOLOGY AND MEDICINE, MELBOURNE.

By C. H. KELLAWAY, M.C., M.D., M.S. (Melbourne), M.R.C.P. (London),
Director of the Institute.

History.

THE Walter and Eliza Hall Institute for Research in Pathology and Medicine was founded through the generosity of the trustees of the late Walter and Eliza Hall, who contributed a sum of money for completion of the pathological block of the Melbourne Hospital and also provided an annual payment of £2,500, which they subsequently increased to £2,600, towards its upkeep. In addition to this sum the institute also receives £500 *per annum* from the University which was voted by the honorary staff of the Melbourne Hospital from its clinical fund. Since 1925 the annual contribution from the Hall Trust has been £3,100 and a further sum of £250 has been provided annually by the University from interest on the Appeal Fund (1924) together with a contribution from the Clinical Research Fund. The institute since its foundation has been under the control of a board consisting of representatives of the Walter and Eliza Hall Trustees, the University of Melbourne and the committee and medical staff of the Melbourne Hospital. The members of the board at present are: Dr. R. R. Stawell (Chairman), Sir Leo. Cussen, Sir John Monash, Professor Peter MacCallum, Mr. C. Lort Smith (Honorary Treasurer) and Dr. C. H. Mollison.

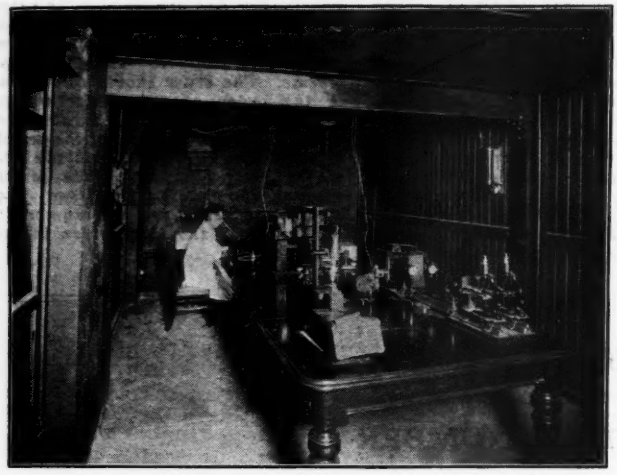

FIGURE I.
Physical Room, with Polarimeter, Refractometer and Other Apparatus.

In 1916 when the building was completed, so many men were on service overseas that it was thought inadvisable to appoint a permanent staff immediately. Sir Harry Allen was, therefore, appointed Honorary Director, with a part-time assistant.

During the building of the Commonwealth Serum Laboratories the director and his staff occupied the top floor of the institute and commenced there the preparation of vaccines and sera.

In 1919 Dr. S. W. Patterson was appointed first Director and commenced to collect a permanent staff and to equip the laboratories. In April, 1923, he resigned and was succeeded by Dr. C. H. Kellaway in August, 1923. During the interval Mr. H. Dew, F.R.C.S., acted as Director.

The annual expenditure of the institute during the last six years affords an indication of the rate of its growth. In 1922-23 it was £3,798, in 1923-24 £4,413, in 1924-25 £5,374, in 1925-26 £5,217, in 1926-27 £6,621 and in 1927-28 £7,504. These figures do not include the amount spent by the Committee of Management of the Melbourne Hospital on the maintenance of its pathological service. The excess of expenditure over the annual assured income of the institute has been provided by generous gifts from the Edward Wilson (*The Argus*) Trust, the Felton Trust, the MacPherson Trust, the Sumner Trust and from private individuals. These gifts for the most part have been for special purposes. In 1926 the late Sir Aaron Danks, Chairman of the Board of Management from 1918 to 1928, established an endowment fund which it was hoped would reach a total of £30,000. The interest was to be devoted to the maintenance of a biochemical research department. This fund has now reached a total of £8,000 and the Edward Wilson Trust has generously maintained this department up to the

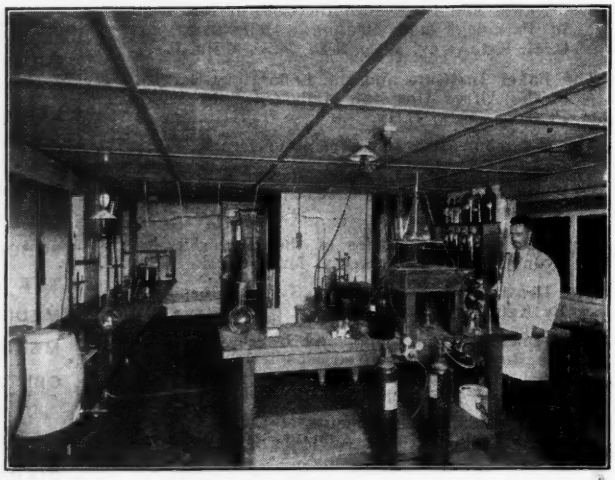

FIGURE II.
Physiological Laboratory with Kymographs and Apparatus.

present time. The Felton Bequest Committee has on several occasions come to our assistance and money contributed from this source has been devoted to the general work of the institute.

The Grice cancer research scholars and the University clinical research scholars have for the most part carried on their researches at the institute and their expenses have been met out of moneys provided from these scholarship funds.

Last year the Commonwealth Government made a special grant to the institute which enabled us to secure the services of Dr. N. Hamilton Fairley to undertake the general direction of certain special researches on hydatid disease, on the venom of Australian snakes with a view to the production of antivenine and on bilharzia. Money was also allotted to work on anterior poliomyelitis by Dr. F. M. Burnet and on the serological diagnosis of cancer.

In the previous year two smaller grants were made, one for the provision of special apparatus and one for a special statistical study of the regional distribution of cancer in the hospital population.

The Building and Equipment.

The building is situated in the south-western corner of the grounds of the Melbourne Hospital in immediate proximity to the hospital and *post mortem* rooms. In it are housed the routine pathological services of the hospital as well as the research staff of the institute.

It consists of a basement with animal houses, a ground and first and second floors. The animal accommodation is on the south side of the building adjoining the basement and consists of a block of four brick houses with two larger houses placed above them. A large proportion of the ordinary laboratory animals used for research and diagnostic purposes are reared here. In recent years the hygienic conditions in this accommodation have been greatly improved. A steam fed boiler is provided for sterilizing cages.

In the basement there is an excellent dark, dust free and well ventilated physical room (see Figure I) in which are set up a polarimeter, a Pulfrich refractometer, a Barnard comparison ultra-microscope and a spectrocomparator. Mercury vapour lamps are fitted as light sources for some of these instruments. There is also a large physiological laboratory (see Figure II) equipped with kynographs, animal operating table and power table. In the pump room (see Figure III) a special power plant has been set up to supply water at a constant high pressure for vacuum pumps. In this room are a series of water pumps, a mercury vapour pump and a vacuum drying oven. There is also a large, high-power centrifuge. The remaining rooms in the basement are a commodious store room, a workshop and an animal *post mortem* room.

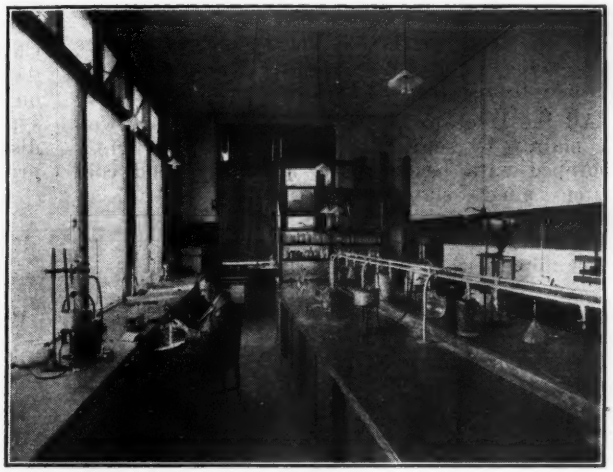

FIGURE IV.
Bio-chemical Laboratory.

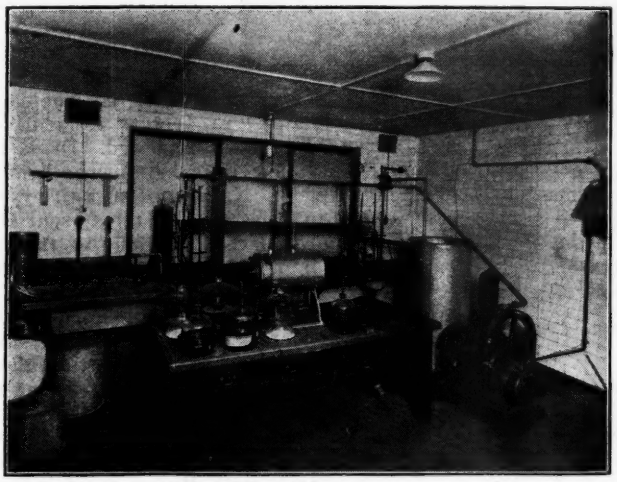

FIGURE III.
Pump Room with Special Power Plant.

The ground floor is mainly devoted to hospital routine work. There are five laboratories on this floor, the routine bacteriological, the routine biochemical and a large laboratory devoted to electrocardiography and basal metabolism, the Director's private laboratory and the hospital pathologist's laboratory. In addition there is a balance room and the office of the Director's secretary.

On the first floor are four excellent laboratories, one of which is devoted to routine pathological histology and has a dark room adjacent and equipment for photomicrography. Another is devoted to media making and has opposite it a media kitchen, equipped with steamers,

autoclaves and a hot air oven. The two remaining laboratories are devoted to biochemistry, one (see Figure IV) occupied by the research bio-chemist and one by the research biochemical student. The research biochemical department is now excellently equipped in regard to bench space and plentifully supplied with balances, special apparatus and glassware.

On this floor there is also the museum, the museum preparation room, the glass cleaning room and a passage way leading directly to the hospital *post mortem* rooms. On this floor there is also a large Kelvinator for research purposes.

On the top floor is the library and four large and well lit laboratories; this floor is wholly devoted to research in bacteriology and serology.

All the laboratories, fifteen in number, are well lit mainly by south lighting and are excellently equipped with bench space, sinks, hot and cold water and slate benches for incubators, balances and other apparatus.

Library.

The nucleus of the library was formed by the private collection of books and journals left to us by Dr. G. C. Mathison. The library proper was founded in 1924 by a gift of £3,000 from the Edward Wilson Trust. It is housed in a large, airy and well lit room on the top floor (see Figure V), with book stacks and furniture of silky oak. We have now very useful series of journals in medicine, pathology, bacteriology, biochemistry and physiology. Miss K. Baverstock, the Librarian of the National Institute of Medical Research, London, has taken a great interest in the library, and it is largely thanks to her efforts on our behalf that complete sets of a number of journals have been procured.

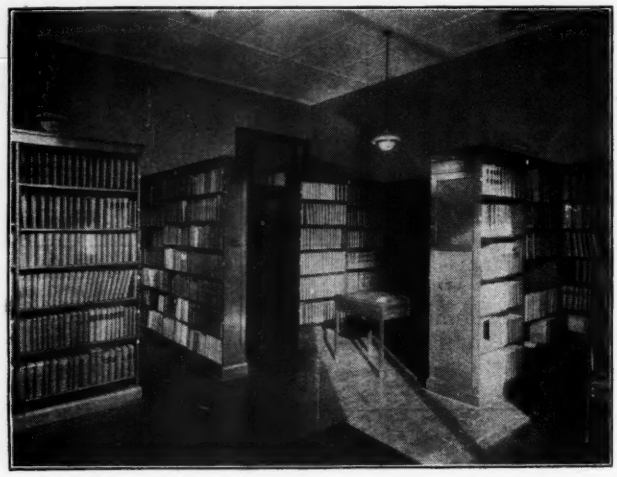

FIGURE V.
The Library.

The Museum.

The museum (see Figure VI) now contains over 500 excellent colour preparations each fully described with clinical notes and with a corresponding series of microscopical preparations. The specimens are arranged against a dark background and are viewed by artificial light. Its present state of efficiency is due to the early work of Mr. H. Dew and later to that of Dr. Keith Ross, Dr. Gordon Cameron and of the present curator, Dr. Wright Smith.

The Research of the Institute.

During the war years work on syphilis in relation to renal and cardio-vascular disease was carried out by the Honorary Director, the late Professor Sir Harry Allen. After Dr. Patterson's arrival in 1919 attention was focused for the three following years on some of the commoner bacterial infections, notably on epidemic diarrhœa and dysentery, influenza and pneumococcal infections. This work was inspired by Dr. Patterson and constituted a most useful contribution to our knowledge of these infections in Australia. Later work on dysentery was carried out by Miss Williams in cooperation with Dr. Reginald Webster, pathologist at the Children's Hospital. Dr. N. Hamilton Fairley, then Assistant Director, contributed important papers on bilharzia and on the serological diagnosis of syphilis and inaugurated the work on hydatid disease which has formed the subject of a large proportion of the later work from the institute. His first paper was on complement fixation in hydatid disease and in it he laid down a standard technique for routine diagnosis. Mr. H. Dew commenced in 1922 to contribute a series of papers on the morphology and development of *Tænia echinococcus* in man and in the herbivora and on pathological, clinical and surgical aspects of the disease in man which he concluded with the recent publication of his book in which the whole subject is exhaustively reviewed. Dr. Keith Fairley in addition to his clinical studies on hydatid disease made with Dr. N. Hamilton Fairley the first observations in Australia on the Casoni skin test. He also improved the technique of the precipitin reaction for diagnostic purposes in this disease. Mr. Dew's work on brain tumours and on tumours of the testicle is well known. For his essay on this last subject he was awarded the Jacksonian Prize of the Royal College of Surgeons, England, in 1923. Another important contribution during the early years of the institution was Dr. S. O. Cowen's work on familial hæmolytic splenomegaly. He has continued work on blood diseases and his subsequent publications have dealt with the value of splenectomy in acute purpura and (with Miss Maud Cowen) of the Van den Bergh reaction in the clinical study of jaundice.

The present Director's contribution to the work of the institute has included a series of papers

on the immunology of hydatid disease with special reference to anaphylaxis and on the pathology of renal disease. The latter series of papers have included studies of specificity of tissue proteins, of the source of albumin in the urine in experimental nephritis (with Dr. G. F. S. Davies and Miss Williams), of compensatory hypertrophy of the kidney (with Dr. G. Cameron), of ascending renal infection) with Dr. C. J. O. Brown and Miss Williams) and of focal infection in relation to renal disease.

Dr. Gordon Cameron, who was Assistant Director from 1924 to 1926, contributed papers on pancreatic regeneration, on the influence of thyreoid feeding on the islet tissue and a joint paper with Mr. A. B. P. Amies on the œstrous cycle of the guinea pig. He also did work on the enzymes of the hydatid cyst and contributed morbid anatomical studies with Dr. L. E. Hurley and later with Dr. Wright Smith.

Dr. F. M. Burnett, while Senior Resident Pathologist (1923-25), worked on the influence of hydrogen peroxide and of dyes on bacteriological growth, on smooth and rough variation and on bacteriophage. These fundamental studies he subsequently continued at the Lister Institute, London, where he held a Beit Fellowship.

Other work at the institute has included studies in *pyorrhœa gingivæ* by Dr. J. M. Lewis, on tuberculous disease of the hip joint by Dr. C. J. O. Brown, on the liver glycogen after partial pancreatectomy by Miss Splatt, on *cystitis cystica* by Mr. Alan Hailes and F. M. Burnet.

During the last two years Dr. Lucy Bryce was working for the Obstetrical Research Committee on the bacterial flora of the female genital tract in pregnancy and the puerperium. At an earlier period with Miss Williams she contributed a useful paper on the complement fixation test in tuberculosis.

Cancer.

The Grice cancer research students have successively worked in these laboratories and the present Fellow, Dr. Thomas Cherry, for the first two years of his tenure of the fellowship carried out his experimental investigations on the effect of the intradermal injection of small doses of *Bacillus tuberculosis* into mice and of its influence on the incidence of cancer in these animals.

FIGURE VI.
The Museum.

Staff.

The present research staff of the institute consists of the Director, Dr. C. H. Kellaway, Dr. N. Hamilton Fairley (in charge of researches for the Commonwealth Government), Dr. F. M. Burnet (Assistant Director), Mr. H. F. Holden (Biochemist), Miss F. E. Williams, Miss Freeman, Miss Mackie, Mr. Southwood, the Director's secretary and librarian and a technical staff of seven assistants and two cleaners. In addition the hospital routine staff is composed of Dr. Wright Smith (morbid anatomy and curator of the museum), Dr. Lucy Bryce (clinical pathology), Miss B. Splatt (bio-chemistry), Miss Cecil Maudsley (basal metabolism and electrocardiography), four technical assistants and a stenographer.

Members of the hospital routine staff have contributed to the research output. Miss Cecil Maudsley, for example, has been responsible for the microphotography and for the general photographic work of the institute.

The Bio-chemical Department has now been in existence nearly two years and work has been carried on chiefly on the constitution of globins derived from the hæmoglobins of mammalian blood, on the phenomenon of denaturation and on the antigenic powers of globin. Particular attention is being paid to optical methods in the investigation of these problems. Mr. Holden has associated with him a biochemical research student, Miss F. Freeman, B.Sc. The workers of this department have also made many valuable contributions to the general work of the institute.

Recent Work.

The Royal Commission of Inquiry into the Fatalities at Bundaberg did much of its work at this institute and had the help of several workers here, notably Dr. Burnet, Mr. Holden and Miss F. E. Williams.

Dr. F. M. Burnet is now studying experimentally the curative properties of human serum from recovered patients in the treatment of infantile paralysis. He has associated with him in this work Dr. Jean Macnamara who has been collecting such serum here during the last two years for the Melbourne City Council. In his studies on the antigenic properties of staphylococci, of smooth and rough variants and of bacteriophage he has associ-

ated with him a bacteriological research student, Miss C. Mackie, B.Sc.

During the last eighteen months Dr. N. Hamilton Fairley has been working at the institute and has carried out important studies on the biting mechanism of the Australian colubrines and on the value of ligature in treatment of snake bite and has collected quantities of venom which are being used for the preparation of antivenine against death adder and tiger snake venom at the Commonwealth Serum Laboratories. The Director has also been engaged in the study of the pharmacology of snake venom and effects produced by them in laboratory animals. Dr. Fairley with Dr. Wright Smith has made further observations on the development of echinococcosis in the ox, sheep and pig, and with Mr. Penrose, B.V.Sc., at the City Abattoirs, has been responsible for an extensive survey in sheep, cattle and pigs to determine the incidence of hydatid, fluke, lung worm and certain other diseases. Immunological studies on hydatid disease have also engaged the attention of workers at the institute. Dr. N. H. Fairley and Miss Williams have done the complement fixation, Dr. Keith Fairley, Dr. N. H. Fairley and Miss Williams have carried out further researches in the skin test with particular regard to its reaction in syphilitic patients and in patients infested with other helminths. The Director has at the same time studied similar problems using the anaphylactic method. Dr. Hamilton Fairley and Miss Williams have recently described a new skin test for bilharzia.

Reference to these various researches may be found in the appended list of publications.

List of Publications of the Institute.

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Patterson, S. W. and Williams, F. E.: "Bacteriology of Acute Respiratory Infections," *Transactions, Australasian Medical Congress*, 1920, page 254.

Fairley, N. Hamilton: "Helminthic Infestations," *Transactions, Australasian Medical Congress*, 1920, page 227.

Fairley, N. Hamilton and Dew, H.: "Pathology of Malarial Infections," *Transactions, Australasian Medical Congress*, 1920, page 637.

Stevens, P. A.: "Epithelioma of Lip," THE MEDICAL JOURNAL OF AUSTRALIA, November 20, 1920, page 472.

Stevens, P. A.: "Nasal Polypi," THE MEDICAL JOURNAL OF AUSTRALIA, December 11, 1920, page 533.

Patterson, S. W., Williams, F. E. and Johnston, W. W. S.: "Laboratory Diagnosis of Enteric Fever," THE MEDICAL JOURNAL OF AUSTRALIA, November 12, 1921, page 425.

Fairley, K. D.: "Treatment of Typhoid Fever with Intravenous Vaccines," THE MEDICAL JOURNAL OF AUSTRALIA, November 12, 1921, page 428.

Dew, H. and Fairley, N. Hamilton: "Dysenteric Infections," THE MEDICAL JOURNAL OF AUSTRALIA, June 4, 1921, page 453.

Patterson, S. W. and Williams, F. E.: "Epidemic Diarrhœa," THE MEDICAL JOURNAL OF AUSTRALIA, June 4, 1921, page 460.

Maudsley, H. F.: "Blood Conditions in Acute Pneumonia," THE MEDICAL JOURNAL OF AUSTRALIA, June 11, 1921, page 484.

Dew, H.: "Amœbic Abscess of Liver," THE MEDICAL JOURNAL OF AUSTRALIA, December 3, 1921, page 510.

Fairley, N. Hamilton: "Studies in Syphilis," THE MEDICAL JOURNAL OF AUSTRALIA, December 24, 1921, page 587.

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Fairley, K. D.: "Hydatid Disease of Lung," THE MEDICAL JOURNAL OF AUSTRALIA, April 1, 1922, page 346.

Dew, H.: "Tumours of the Brain," THE MEDICAL JOURNAL OF AUSTRALIA, May 13, 1922, page 515.

Derrick, E. H.: "Renal Tumours," THE MEDICAL JOURNAL OF AUSTRALIA, June 10, 1922, page 622.

Patterson, S. W.: "Prognosis of Pneumonia," THE MEDICAL JOURNAL OF AUSTRALIA, July 29, 1922, page 115.

Patterson, S. W. and Williams, F. E.: "Pfeiffer's Bacillus and Influenza," *The Lancet*, October 14, 1922, page 806.

Fairley, K. D.: "Peritoneal Echinococcosis," THE MEDICAL JOURNAL OF AUSTRALIA, August 19, 1922, page 209.

Dew, H.: "Observations on the Mode of Development of Brood Capsules and Scolices in the Encysted State of Tænia Echinococcus," THE MEDICAL JOURNAL OF AUSTRALIA, September 30, 1922, page 381.

Patterson, S. W. and Williams, F. E.: "Bacteriology and Pathogenicity of the Sonne Bacillus," *Journal of Pathology and Bacteriology*, 1922, Volume XXV, page 393.

Patterson, S. W. and Cowen, M.: "Bile Pigments in the Blood," THE MEDICAL JOURNAL OF AUSTRALIA, November 18, 1922, page 581.

Patterson, S. W.: "Recent Pathological Methods in Relation to Nursing," *Una*, November, 1922.

Dew, H.: "Observations on the Pathology of Schistosomiasis in the Human Subject," *Journal of Pathology and Bacteriology*, 1923, Volume XXVI, page 27.

Cowen, S. O.: "Familial Hæmolytic Splenomegaly," THE MEDICAL JOURNAL OF AUSTRALIA, November 11, 1922, page 545.

Fairley, N. Hamilton and Williams, F. E.: "Observations on the Complement Fixation Reactions in Liver Flukes," *Journal of Pathology and Bacteriology*, 1923, Volume XXVI, page 19.

Apperly, F. L.: "The Mechanism of Hyperchlorhydria," THE MEDICAL JOURNAL OF AUSTRALIA, January 13, 1923, page 33.

Patterson, S. W.: "A Complement Fixation Test in Coccidiosis of the Rabbit," *British Journal of Experimental Pathology*, 1923-24, Volume IV, page 1.

Patterson, S. W. and Bryce L.: "The Diagnosis of Pulmonary Syphilis," THE MEDICAL JOURNAL OF AUSTRALIA, March 24, 1923, page 316.

Patterson, S. W.: "Amœbic Dysentery in Women," THE MEDICAL JOURNAL OF AUSTRALIA, March 24, 1923, page 323.

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Fairley, K. D.: "Hydatid Disease of the Liver," THE MEDICAL JOURNAL OF AUSTRALIA, February 23, 1924, page 177.

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Patterson, S. W. and Williams, F. E.: "Preliminary Note on a Stable Antigen for the Complement Fixation Test," THE MEDICAL JOURNAL OF AUSTRALIA, November 3, 1923, page 467.

Fairley, K. D.: "The Treatment of Typhoid Fever by Intravenous Vaccines," THE MEDICAL JOURNAL OF AUSTRALIA, September 22, 1923, page 291.

Burnet, F. M.: "Preliminary Note on a New Method of Serological Investigation in Cases of Suspected Typhoid Fever," THE MEDICAL JOURNAL OF AUSTRALIA, March, 1924, page 205.

Dew, H. and Williams, F. E.: "Diagnostic Methods in Hydatid Disease," *Transactions of the Australasian Medical Congress (British Medical Association)*, First Session, Supplement to THE MEDICAL JOURNAL OF AUSTRALIA, March 15, 1924, page 113.

Wanliss, M.: "Malignant Disease of the Uterus," THE MEDICAL JOURNAL OF AUSTRALIA, November 22, 1924, page 543.

Bryce, L., Kellaway, C. H. and Williams, F. E.: "A Study of Hydatid Antigen," *Australian Journal of Experimental Biology and Medical Science*, 1924, Volume I, page 77.

Burnet, F. M.: "Observations on the Agglutinins in Typhoid Fever," *British Journal of Experimental Pathology*, 1924, Volume V, page 251.

Bryce, L. and Williams, F. E.: "Complement Fixation Test in Tuberculosis," *Transactions of the Australasian Medical Congress (British Medical Association)*, First Session, Supplement to THE MEDICAL JOURNAL OF AUSTRALIA, April 12, 1924, page 228.

Williams, F. E. and Bryce, L.: "The Complement Fixation Test in Tuberculosis," *Journal of Pathology and Bacteriology*, 1924, Volume XXVII, page 401.

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THE BAKER INSTITUTE AND THE LABORATORY SERVICE OF THE ALFRED HOSPITAL, MELBOURNE.

By W. J. PENFOLD, M.B., B.Hy.,
Director of the Baker Institute.

Historical Development.

IN November, 1922, a member of the honorary medical staff of the Alfred Hospital outlined a proposal for the establishment of a bio-chemical section in the laboratory service of the hospital. He suggested that one of the students of the hospital should be sent to the old country or America to gain experience in the new work and to meet those on the other side of the world who were actually in the forefront of the advance in the subject. These proposals commended themselves to the medical staff which formed a subcommittee under the chairmanship of Mr. Balcombe Quick, to consider the matter and advise the Board of Management whenever required.

The proposition was brought before the managers in November, 1922, by Dr. A. V. M. Anderson, who announced to them that the before-mentioned honorary physician was prepared to finance the trip abroad of, say, twelve months' duration of the man selected to do this work. The Board was in warm sympathy with this proposal and appointed a subcommittee to confer with the subcommittee of the medical staff in order to find a basis for the scheme which would be acceptable to all parties. The joint subcommittees in March, 1923, resolved to recommend the Board of Management to establish a department of bio-chemistry. In May of the same year preliminary bio-chemical equipment was obtained and a little later Miss Jean Robertson, B.Sc., was appointed bio-chemist. Miss Robertson received much help and support from Dr. Young, Professor of Bio-chemistry at the University.

In June, 1923, while the same honorary physician was in London, he was greatly impressed by the work being done by Dr. Maclean at St. Thomas's Hospital and sent for Dr. Corkill, a recent Melbourne graduate and student of the Alfred Hospital, to go to London and take up the work under Maclean.

In January, 1924, the Board, on the suggestion of this same honorary physician, communicated in a letter containing cogent financial guarantees from Mr. Thomas Baker and Mr. F. D. Michaelis, resolved to appoint Dr. Corkill on his return from England to the position of bio-chemist to the hospital. He actually commenced duty in May, 1924, and set to work vigorously to develope the routine bio-chemistry of the hospital.

In April, 1925, plans for a laboratory building to cost £4,000 were placed before the Board and were approved. In January, 1926, the Board received a communication from Mr. Thomas Baker announcing his willingness to provide for the cost of building and the maintenance of the new department for a period of five years at an estimated cost of £20,000. The offer was gratefully accepted. It was supplemented in April of the same year by the offer of a further sum of £1,500 a year for five years. The scope of the institute was also widened so as to enable research in any of the branches of laboratory medicine to be undertaken in it.

A director of research was desired and for this purpose in 1926 two subcommittees were formed to consider the selection of a director, one subcommittee in Melbourne and the second in London. The London subcommittee consisted of Sir C. J. Martin, of the Lister Institute, Dr. Dale, of the Hampstead Institute, and Dr. Hugh Maclean, of St. Thomas's Hospital, together with Sir George Fairbairn, Agent-General for Victoria.

The writer was a member of this subcommittee in the first instance, but was asked to retire from it by the other members. In May, 1926, the Board

of the hospital executed the Thomas Baker trust deed and the first meeting of the trust was held on May 10, 1926, when Mr. Thomas Baker, Mr. H. M. Collins and Dr. Mackeddie, foundation trustees, were present. The second meeting of the trust was held on June 2, when the first report of the technical work of the bio-chemist was presented. In October, 1926, it was announced that the selection committee had recommended and the trustees had approved of the appointment of a director of the institute. The appointment was for a period of five years and the writer took up this position on February 24, 1927.

As set out in a subsequent section, the objective of the Baker Institute was to provide a routine bio-chemical and bacteriological service for the hospital and in addition and principally to conduct medical research. Shortly after the appointment of the Director, Mr. A. J. Trinca, who had formerly held the office of part-time Pathologist at the hospital, resigned his position and an opportunity was given for the reconsideration not only of the staffing of the pathological department, but also of the lines along which the pathological laboratory service of the hospital and the research service of the Baker Institute might develope. Mr. Baker, Professor MacCallum, Dr. Mackeddie, Dr. Trinca, Dr. Corkill and the writer considered this question jointly and it was agreed to be desirable that a pathological, a bio-chemical and bacteriological registrar should each be appointed, these registrars to hold office for two years and to be primarily responsible for the routine reporting work of the hospital. In each section of the work a senior medical officer was to be set apart for research in that section and to act as consultant and guide to the reporting medical officer. This scheme envisaged six full-time medical officers for the pathological, bio-chemical and bacteriological service of the hospital and for research. Up to the present it has been partly realized as follows:

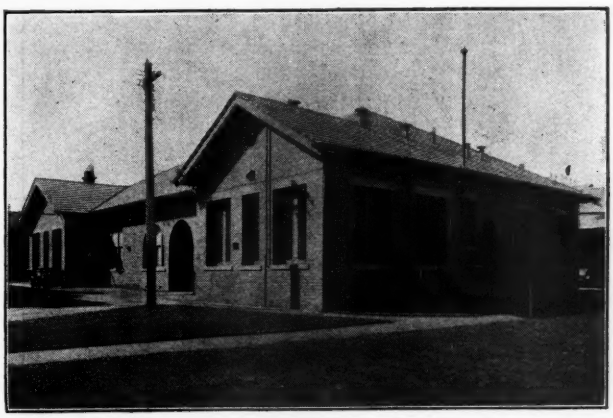


FIGURE I.
The Pathological Block, Alfred Hospital.

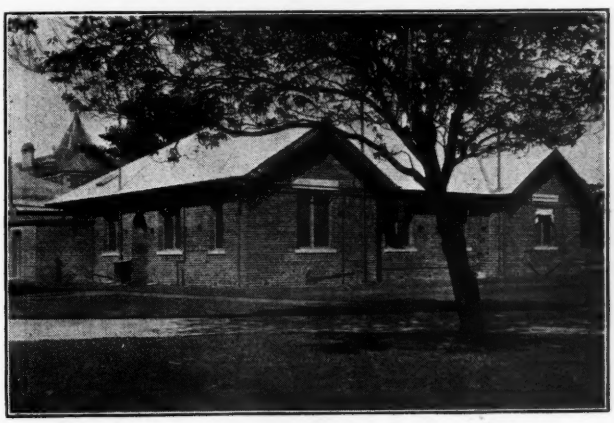


FIGURE II.
The Baker Institute.

Dr. Corkill is set apart for bio-chemical research work, while Dr. Travers is responsible for the bio-chemical routine work. Dr. John Fiddes, formerly Assistant to the Professor of Physiology, University of Aberdeen, has been appointed full-time pathologist to the hospital. Hospital pathology is very commonly an uninviting subject. The morbid macroscopic and microscopic anatomy of the dead makes but a limited appeal, while the study of pathological function is fascinating in itself and in recent years has been most productive in its results. On that account, therefore, it was felt that one well trained in physiological laboratory methods would be a great acquisition to the pathological department of the hospital. This was the more justifiable as Mr. Trinca, the former pathologist, who had devoted much of his time to the microscopic anatomy of tumours and other morbid tissues, desired to continue his connexion with the department as Honorary Curator of the Pathological Museum. Dr. John McLean was appointed as Assistant Pathologist and several interesting studies of pathological function are now in progress in that section of the work.

The bacteriological research work of the hospital is in the hands of the writer, who is also at the present time directly responsible for the routine bacteriological work, a bacteriological registrar not having been yet appointed.

All these medical workers are well supported by lay assistants, so that the institute should shortly get into its stride and make a very definite impression on the progress of Australian laboratory medicine. Great importance is attached to the routine laboratory work. It is felt that only on that foundation is a high standard of research to be looked for.

Medical and Scientific Personnel with Conditions of Employment.

Medical Personnel.

Full time: Five members of the staff receiving salaries ranging from £200 to £1,500 *per annum*; two voluntary workers.

Part time: One worker receiving £100 *per annum*; six voluntary workers.

Scientific Personnel.

Three bachelors of science and four technical assistants receiving salaries ranging from £200 to £650 *per annum*.

The hours of employment are from 9 a.m. to 5 p.m. and the workers of the institute are entitled to three weeks' holiday annually, together with all public holidays.

Voluntary Workers.

When a voluntary worker applies for permission to work in the institute, he is asked to state in writing for the information of the trustees the amount of time that he is able to spend per week on the work and the nature of the work that he desires to undertake. It is felt by the trustees inadvisable to have casual workers who come at irregular times and who have rights to facilities which may be insufficiently used.

Junior workers coming into the institute for the first time have their attention drawn to the following rules:

(i) Each worker must conduct his experiments so as not to interfere with the work of other workers.

(ii) If assistance is inevitable, owing to the nature of the work, such assistance may be obtained from any worker in the laboratory by arrangement with the senior officer in charge of such worker.

(iii) Each honorary worker is appointed for a probationary period of two months. If sufficient promise is not shown in this period, the appointment automatically terminates.

(iv) Workers are requested to acquaint themselves with the library rules.

(v) Full laboratory notes must be kept of experiments and should be available at any time for discussion with the Director.

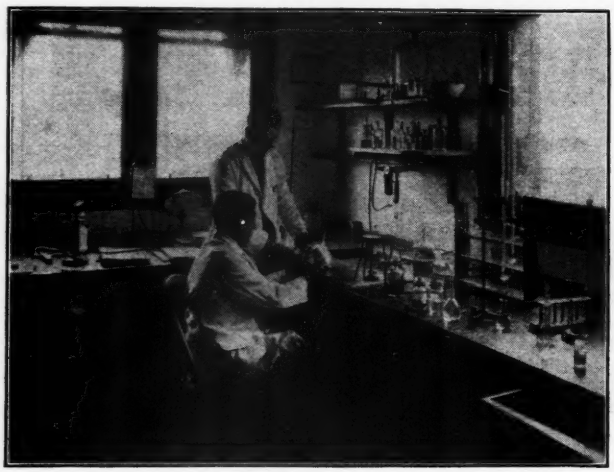


FIGURE III.
One of the Bio-Chemical Research Laboratories.

FIGURE IV.
Routine Bio-Chemical Laboratory.

The Objectives of the Baker Trust.

The objectives of the Baker Trust as set out in the trust deed of May 10, 1926, are as follows:

(*a*) The maintenance and extension of the bio-chemical laboratory.

(*b*) Medical research work generally, effectively using the opportunities that the hospital material provides.

(*c*) Work related to the above objectives at the discretion of the trustees.

(*d*) The conduct of medical research in any part of the State of Victoria or elsewhere.

(*e*) Provision of facilities for the honorary and resident staffs of the hospital to cooperate in medical research work.

(*f*) Instruction of medical students and graduates.

(*g*) Such other objectives as may be determined from time to time by the trustees.

Description of the Institute.

The laboratory service of the Alfred Hospital, Melbourne, is conducted in two buildings, an older pathological block (see Figure I) and the more recently built Baker Institute (see Figure II). All the bio-chemical work of the hospital is conducted in the Baker Institute and a certain portion of its bacteriological work, with some overflow of the latter, however, into the pathological block.

Both these buildings are single storied, but the Baker Institute has been so built that a second

floor may be put on to the building whenever the volume and success of the work warrant such a change. The ground plan of the Baker Institute (see Figure VII) will show that there are three bio-chemical laboratories, two small ones for individual research workers, one illustrated in Figure III, and a large one for the routine bio-chemistry of the hospital and voluntary workers, shown in Figure IV. Similarly, there is one large bacteriological research laboratory (Figure V), a small laboratory for routine serology, Wassermann reactions and the like, offices for the Director and secretary and electrocardiographic laboratory with dark-room attached, all of which are indicated on the scale plan (Figure VII).

The pathological block (see Figure VIII), on the other hand, shows a laboratory for experimental pathology, equipped with an up-to-date kymograph (see Figure VI), a pathological museum and laboratory for the use of Mr. Trinca, its curator, two bacteriological laboratories for routine purposes, a media room and a hæmatological laboratory adjoining the *post mortem* room.

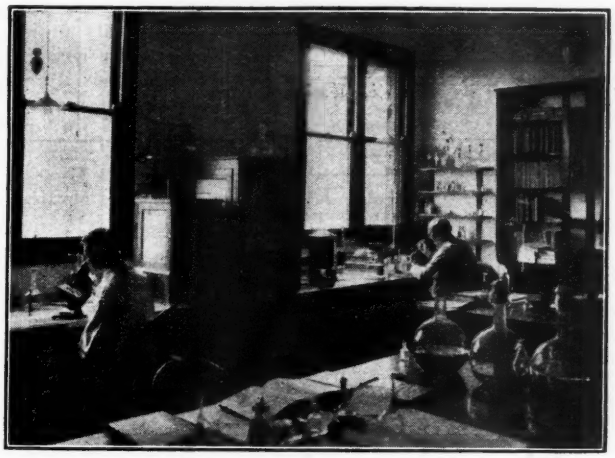


FIGURE V.
Bacteriological Research Laboratory.

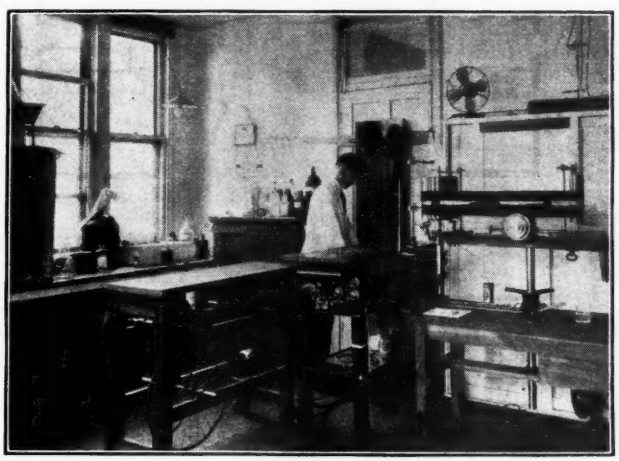


FIGURE VI.
Portion of Laboratory for Experimental Pathology.

The teaching of students and post-graduates is commonly conducted in the museum, the hæmatological laboratory and the large bio-chemical laboratory of the Baker Institute.

The Animal Houses.

The animal houses (Figure IX) have indoor pens for normal guinea pigs, mice and rabbits and also a special room set apart for inoculated animals. These rooms are artificially heated so that the animals live under ideal conditions. The stocks are mounting and at the moment we have over 1,600 mice, 700 guinea pigs, 50 rabbits, three sheep and one monkey.

Equipment.

The institute is well equipped with the apparatus required for routine hospital laboratory work. It has, for example, an electro-cardiograph, two complete Zeiss microscopes, a variety of apparatus for doing basal metabolic investigations *et cetera*. It has also a considerable amount of research equipment, including the most recent model of kymograph which has been selected to meet the requirements of the problems being investigated.

Library.

The books are scattered in various rooms, but represent a valuable collection dealing with laboratory aspects of medical problems. They are being gradually increased as suitable new books on laboratory medicine are published. A number of current English and foreign medical journals are being taken and gradually complete sets of journals will be acquired. In addition to the foregoing there are studies from various research institutes in other countries, including the studies of the Rockefeller Institute, New York, collected papers of the Lister Institute, London, publications of the Medical Research Council, London, communications of the State Serum Institute, Denmark, proceedings of the Royal Society of Medicine, London, various studies from the Serum Institute, Milan, and from other institutes.

It is hoped that the laboratory will attract many young workers on the threshold of their careers who realize that research is the greatest means of medical education.

THE COMMONWEALTH DEPARTMENT OF HEALTH.

OWING to the removal of the headquarters of the Commonwealth Department of Health from Melbourne to Canberra, it became impossible for the

Director-General of Health to accede to our request for articles dealing with the Serum Laboratories at Royal Park, the Australian Institute of Tropical Medicine, Townsville, the several country laboratories and the projected school for tropical medicine and hygiene at Sydney. The absence of these articles is much to be regretted, for a summary of the facilities for research in Australia is quite incomplete without them. In the following we have endeavoured to present the main facts concerning the Commonwealth laboratories, but we realize that the compilation is but an epitome of the facts and falls short in interest as compared with a series of articles written by the workers in the laboratories.

The Commonwealth Serum Laboratories.

The Laboratories Division of the Department of Health came into existence in 1916, when the Commonwealth Serum Laboratories were opened at Royal Park. In the previous year the Director, Dr. W. J. Penfold, worked for a time at the Walter and Eliza Hall Institute for Research in Medicine and Pathology at the Melbourne Hospital. The Serum Laboratories were planned primarily for the purpose of producing therapeutic serum, vaccines and other biological preparations. The institution, however, has three other objectives. There is provision for public health work; arrangements are present for the training of medical practitioners and others in bacteriology and immunology; research is conducted both in connexion with the ætiology of disease and in connexion with the production of biological products employed in the diagnosis and treatment of disease.

In the course of the ten years of their existence the Serum Laboratories have expanded very considerably. The serum department comprises laboratories for the culturing of bacteria and for the production of toxins used for the preparation of antitoxic and bactericidal serum, for the immunization of horses and other animals, for the collection of serum and for the titration of specific serum. Connected with this set of laboratories are those set aside for the production of vaccines, for the concentration of antitoxic serum and for the preparation of tuberculin. There is a special department for the manufacture of active calf lymph for vaccination against variola. There is another laboratory for the isolation and recognition of bacteria isolated from patients. This is called the diagnosis laboratory. Other laboratories have been reserved for research work and for the training of the personnel of the country laboratories. The animal house is large and well arranged and there are extensive paddocks for the horses. Rooms for the preparation of culture media and admirable cold rooms are found in the basement. The institution was developed by Dr. W. J. Penfold, under whose directorship it passed through the first eleven years. The present Director is Dr. F. G. Morgan, who is devoting much attention to the organization of the routine work and who has done much to coordinate the work of the individual departments. The biochemical work has undergone many changes since its institution and is now well established and controlled.

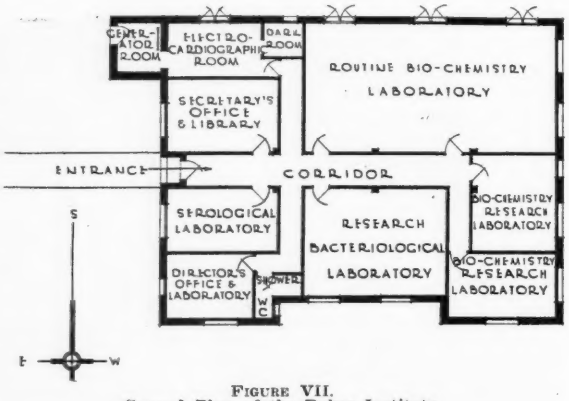


FIGURE VII.
Ground Plan of the Baker Institute.

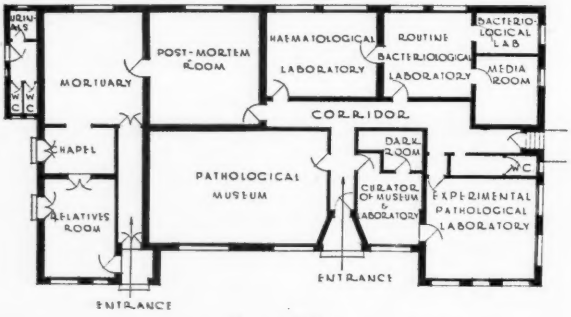


FIGURE VIII.
Ground Plan of the Pathological Block.

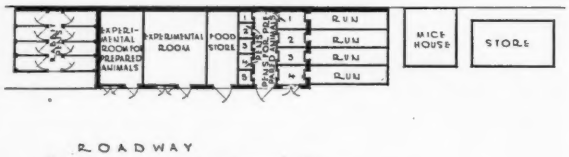


FIGURE IX.
Ground Plan of the Animal House.

There is ample scope for the prosecution of research in the Commonwealth Serum Laboratories. Apart from the original study which has characterized the work from the first in connexion with the production of therapeutic and prophylactic sera and vaccines, there are facilities for original investigation into bacteriological problems. Although the personnel is relatively large, the number of salaried medical officers is insufficient for much organized research. There are three medical officers, a bio-chemist and a staff of technical assistants as well as a clerical staff. Voluntary

research workers are welcomed and are given every aid in their work.

It thus appears that those who are fortunate enough to be appointed to the permanent staff of the Commonwealth Serum Laboratories, are encouraged to carry out original investigations. The only limitation to this class of work is that imposed by the routine of the laboratories. The excellent equipment and the scientific atmosphere of the institution contribute towards its high degree of usefulness as a research centre. The library is a valuable asset; in it are found the most important scientific periodicals and many books of reference indispensable to the research worker. The keen practitioner who wishes to employ some of his spare time in laboratory work or who aspires to some position in a research laboratory, will find facilities and friendly assistance that should be invaluable to him in acquiring a sound laboratory technique and in gaining experience in original work.

The Country Laboratories.

It has been mentioned above that part of the function of the Commonwealth Serum Laboratories is the training of the medical and lay personnel of the country laboratories. There are special classes in bacteriology and in the diagnostic and immunological work carried out in clinical bacteriological laboratories. The training given suffices to render the medical officers placed in charge of these country laboratories competent to carry out all the duties required of them.

The laboratories have been established at Rabaul, at Bendigo, Toowoomba, Rockhampton, Lismore, Port Pirie and at Kalgoorlie and will be opened early next year at Cairns and Launceston. The functions of these laboratories are to conduct diagnosis work in bacteriology, in immunology, in bio-chemistry and in morbid anatomy and histology. In addition local medical practitioners are encouraged to work in the laboratories either by carrying out diagnosis work or by prosecuting original research. The staff is available for the purpose of assisting the health authorities in tracing the sources of infective disease. Supplies of serum and vaccines are kept at these laboratories in order that they may be made available immediately an outbreak has been discovered. In some of the laboratories X ray plants have been installed and the staff collaborates with the local medical practitioners in enhancing the utility of the equipment. The medical officers in charge of the laboratories have ample opportunities to undertake original investigational work. The scope is wide and the field is unlimited. Much of the research extends outside the laboratories. At Bendigo Dr. Moore carried out the first large experimental investigation into the practical possibility of detecting the susceptible individuals in the child population to diphtheria and of measuring the value of immunizing processes when applied to these susceptible children. On another occasion the members of the staff of the Kalgoorlie laboratory undertook an important investigation into the incidence of the tuberculous disease known as miners' phthisis; the subject of lead poisoning among the smelters at Port Pirie was investigated by the departmental officers from the laboratory; quite recently a mild form of typhus described by Dr. F. S. Hone was closely studied from the laboratory at Toowoomba. In all these problems the clinical as well as the laboratory aspects have to be examined with meticulous care and the sciences of bio-chemistry, bacteriology, immunology, radiology and morbid histology have to be employed. That these country laboratories have been instrumental in awakening the spirit of inquiry among general medical practitioners is now fully recognized and appreciated. Those whose imaginations have been stimulated, are cordially invited to take part in the various investigations.

The Australian Institute of Tropical Medicine.

It is unnecessary in this place to recite the history of the Australian Institute of Tropical Medicine. The story has been told in these pages already. This institute was founded in 1908-1909 at Townsville, in north Queensland, and was opened in 1911. In its conception it was planned as a research institution and, notwithstanding the fact that it has in recent years been included amongst the activities of the Department of Health, this conception has been retained. The work undertaken is largely of the nature of original research. The remarkable series of observations and the equally remarkable collation of the immense mass of facts and figures in connexion with the effect of heat and moisture on the human being under varying conditions of working and with the physiology of the white man in the tropics carried out Dr. A. Breinl and Dr. H. Priestley will still be remembered. For a considerable time the Australian Institute of Tropical Medicine has been prominently before the eyes of the medical profession as an active centre of research. The staff was in the earlier years a relatively large one and problems in bacteriology, protozoology, bio-chemistry, physiology, entomology and preventive medicine were investigated. In more recent times the staff has been smaller and the output of research work has necessarily been less comprehensive. There is at present an acting director, Dr. A. H. Baldwin, a pathologist, Dr. G. A. M. Heydon, and an entomologist, Mr. Taylor, also a bio-chemist, Mr. Pearce, a medical officer in charge of the health laboratory, Dr. Richards, and three technical assistants. All of them are conducting research work of a high quality. Voluntary workers are welcomed to the laboratories and facilities are given them to enable them to carry out serious experimental research. It is impossible at present to forecast the future of the institution. That it is unfavourably situated for its purpose has been recognized by all interested persons. On the other hand, the institute itself is admirably planned and equipped and possesses an atmosphere eminently suited to its purposes. Apart from research work, the staff undertakes the necessary laboratory work for the Townsville General Hospital and the public health work for the dis-

trict. Arrangements are made for the holding of post-graduate classes for the diploma in tropical medicine of the Australian universities.

Health Laboratory at Rabaul.

In addition to the Commonwealth Serum Laboratories, the country laboratories and the Australian Institute of Tropical Medicine, there is a health laboratory at Rabaul in New Guinea. This laboratory serves the medical service of the mandated territory of New Guinea and is under the administrative control of the Division of Tropical Hygiene of the Commonwealth Department of Health. Although the main activities of the medical officers attached to this laboratory are of a routine character in connexion with the preservation of the native and European population of the territory, a substantial amount of research work has been conducted there since its foundation. Among the functions of the Division of Tropical Hygiene is the task of discovering the insect vectors of tropical diseases and tracing the ætiological factors of these diseases.

Australian Hookworm Campaign.

Mention must be made of the research in the field by the medical officers of the Australian Hookworm Campaign. It will be remembered that the International Health Board of the Rockefeller Foundation collaborated with the Commonwealth Government and with the governments of the several States in the institution of a hookworm survey and a service having for its object the demonstration to the community of how hookworm disease can be eradicated by a systematic control of human excreta and by the treatment of every individual harbouring hookworms. After an agreed period of assistance, the International Health Board withdrew and the campaign has been carried on by the medical officers of the Department of Health. Some remarkable work has been conducted in the field in this connexion. Mention may be made of the elucidation of the flotation method of demonstrating ancylostomum eggs by Dr. H. H. Willis. Opportunities are offered to the medical officers working in the field to conduct original investigations and to make original observations.

The New School of Hygiene and Tropical Medicine.

The Commonwealth Government in collaboration with the University of Sydney is instituting a school of hygiene and tropical medicine. The proposal originated with the Royal Commission on Health. It was urged that a modern school for the special training of medical practitioners in preventive medicine and in tropical medicine at least one school should be established at once in Australia and it was suggested that the best position of such a school would be Sydney. The preliminary steps have been completed and a school is in the course of construction. It is too early to prophesy concerning the nature and extent of the work that will be conducted in this school. If it fulfils its part adequately, it will certainly be necessary for the director and his staff to engage in research work and to encourage original thought and experimental work in the post-graduate students.

THE DEVELOPMENT OF CANCER RESEARCH IN NEW SOUTH WALES.

By H. G. CHAPMAN,
Director of Cancer Research;
AND
F. P. SANDES,
Director of Cancer Treatment, The University of Sydney.

IN 1921 the late J. F. Archibald left by bequest to the University of Sydney the sum of £7,000 to be added to any funds possessed by the University of Sydney for the prosecution of research into the problems of cancer. The Senate of the University of Sydney had previously set aside the sum of £500 to institute a fund for cancer research. After receiving the Archibald bequest, the Senate of the University of Sydney appointed a cancer research committee to take what steps were necessary to commence the study of cancer within the University of Sydney. This committee was appointed by the Senate as the result of a suggestion that the sum of money to be obtained from the Cancer Research Fund was insufficient for any satisfactory study of the problems of cancer. The suggestion was made to the Senate that it appeared possible to devise a comprehensive plan of cancer research. The Senate, therefore, appointed the Cancer Research Committee, made up of members of the Senate of the University, prominent citizens of Sydney and members of the professorial board and of the staffs of the great metropolitan hospitals to prepare a plan for the systematic study of the problems of cancer.

In 1922 as a result of the recommendation of the Cancer Research Committee, the Senate appointed a committee of direction constituted of professors in the Faculty of Medicine and the Faculty of Science to furnish a report as to the lines of research that might be undertaken into the problems of cancer. This committee recommended that research should be undertaken in the departments of physics, bio-chemistry and surgery and that workers in these branches of science should form a team of research workers, the result of whose investigations should be kept in detail before the attention of all the members of the team. The Committee of Direction was of the opinion that research into the effects of radiations upon living tissues should form the chief path of research in the investigations to be undertaken. The committee made the further proposal that an attempt should be made to increase the Cancer Research Fund and that an appeal should be made to the public to provide funds for these investigations. In 1923 the Cancer Research Committee asked the Senate to endorse the proposal for the establishment of a cancer research institute at the University. The Senate considered this proposal and asked the Committee of Direction to prepare a pamphlet for publication by the Cancer Research Committee which would set out the way in which the funds raised for cancer research might be used. It appointed a publicity subcommittee to draw up a scheme for consideration by the Senate whereby an appeal for

funds might be made to the public. These proposals were accepted by the Senate with the result that an appeal was made for funds and the sum of £140,000 has been handed in trust to the Senate for the purposes of cancer research and cancer treatment.

During 1922 and 1923 the Committee of Direction passed in review the various lines of research which might be undertaken at a cancer research institute and came to the decision that a thorough study of the effects of radiations upon living tissues would be a useful line of investigation or more precisely, it was suggested that exact measurements of the quantities of energy (ergs per square centimetre) falling on tissues with radiations of different wave lengths together with measurements of the quantities of energy leaving the tissues after the passage of the rays would give valuable information. It was further recommended that this study should be correlated with that of the position of various atoms in different tissues.

FIGURE I.
Physics Department, the University of Sydney.

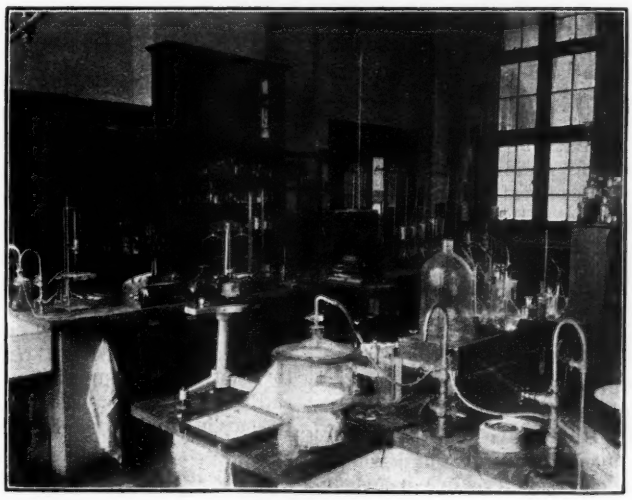


FIGURE II.
Cancer Research Laboratory.

In 1924 a part of the new Physics Laboratory was allotted by the Senate for the study of these bio-physical problems. The Government of the State of New South Wales contributed pound for pound up to £5,000 of public subscription towards the subdivision of this part of the new Physics Laboratory into rooms for bio-physical research. The Government also provided a further sum of £2,500 for the equipment of these research rooms. The Government of the Commonwealth generously contributed to the University of Sydney £2,500 to buy apparatus to carry on the new research work and supplemented this grant at a later date by an additional sum of £5,000 to pay the salaries of research workers. Early in 1925 Mr. George Bosch donated to the University of Sydney £2,000 to pay the salary of a cancer research fellow in bio-chemistry for four years. Dr. J. M. Petrie was selected by the Senate as Bosch Cancer Research Fellow in Bio-chemistry and began the study of the localization of atoms of potassium in certain tissues. As his researches advanced he commenced the systematic study of the number and position of atoms situated in the cells of living tissues.

In the meantime some valuable experiments on the behaviour of the chorio-allantoic of chick membrane when exposed to homogeneous X rays of different wave lengths had been made by Dr. W. Moppett in the physical laboratory of the University of Sydney. These observations which showed how important might be the wave length of radiations in bringing about biological action, have had much influence in determining the problems of research which might be studied in Sydney. Dr. Moppett had adapted the X ray spectrometer as used by Bragg to the study of the effects of radiations of various wave lengths. It is well known that a beam of X rays may be split up into portions of a more or less constant wave length by the use of a crystal of calcite. By altering the angle between the beam of X rays and the crystal it is possible to obtain a "reflected" beam of any particular wave length. These radiations were allowed to fall on the chorio-allantoic membrane of the fowl's egg and eggs which had been incubated for eight days. The chorio-allantoic membrane at this stage is made up of two layers of epithelium enclosing a vascular mesenchyme and it provides a series of embryonic tissues for study. After exposure to radiations the eggs have been incubated for a further four days to

permit of the development of the biological effects of radiations. These experiments were made with a range of radiations varying in wave length from 0·1 to 2·0 Ångström units. The outstanding results of these studies have been that atrophic change may be brought about in the membrane after exposure for 30 to 60 minutes to radiations of certain wave lengths and the specific hypertrophic effects may be noted after exposure to the effects of radiations of other wave lengths. The intermediate radiations did not appear to have much activity in influencing the development of living tissues. The changes which have been observed, have been classified by Dr. Moppett into those of atrophy, hypertrophy, inflammatory reaction and precancerous changes.

The results obtained by Dr. Moppett appeared of such importance to the Cancer Research Committee that it recommended in 1926 the appointment of Mr. W. H. Love to act as Physicist to the cancer research organization. Mr. Love had already worked with Dr. Moppett on the measurement of the wave length utilized by him and was soon able to identify with certainty wave lengths used in this investigation. About this time it was also noted that the observation of some of these radiations would be greatly increased by the presence of lead within tissues. This suggestion led to the recognition of the presence of lead, uranium and molybdenum in the tissues of eggs and to studies correlating biological action with the content of these heavy metals in the tissues of the incubated egg. The part played by these heavy metals in absorbing radiations which affect biological activity, led the Committee of Direction to establish a department for the preparation of colloidal lead by different methods and to institute the treatment of patients by colloidal lead at the Royal Prince Alfred Hospital. Mr. Love took up the study of the distribution of energy in the X ray spectrum in the region used in these investigations and it has been estimated that the amount of energy communicated to the egg membrane per second is of the order of $2{\cdot}2 \times 10^{-4}$ ergs with wave lengths in the vicinity of 0·42 Ångström units to 0·155 Ångström units on the area irradiated, approximately one square centimetre. Such investigations as have been made on the absorption by the egg membrane seem to show that in the vicinity of the wave length of 0·52 Ångström units the chroio-allantoic membrane takes up about 5% of the incident radiation. Other wave lengths found by Dr. Moppett to have an influence on the development of the tissues of the chick embryo, are absorbed in much greater amounts by uranium and molybdenum. In this connexion it might be pointed out that Milliken has drawn attention to the fact that "the therapeutic effects of ultra-violet light, of Röntgen rays and of γ rays of radium are all necessarily to be fundamentally attributed to the fact that all of these rays have the power of detaching electrons from atoms."

Mr. W. B. S. Bishop, who was appointed Bosch Cancer Research Fellow after the death of J. M. Petrie in 1927, was able to show that all fowls' eggs obtained in Sydney contained appreciable quantities of lead. As a rule a single egg contained about one-half milligramme of lead. The study of the atoms present in chickens' eggs has been begun by Miss Winifred Mankin, B.Sc., appointed bio-chemist in 1926. She has shown that many thousands times as much energy of those particular wave lengths which are absorbed by the lead atom, is taken up by the lead atom as compared with an atom of lower atomic weight. Further, it has been found that the white and yolk of the egg absorb practically all the radiation used by Dr. Moppett in experiments.

At the commencement of 1926 the Publicity Subcommittee of the Cancer Research Committee made a public appeal to the people of New South Wales for funds and rather more than £140,000 was collected before the end of the year. The Federal Government in 1922 made a grant of £2,500 to increase the speed of the investigations. As a result two bio-chemists and a medical biologist with various assistants have been appointed. During the same year the Cancer Research Committee joined with the Government of the State of New South Wales in inviting Dr. Burrows, of Manchester, to report on the use of radium in the treatment of cancer. At the commencement of 1927 the main metropolitan hospitals in Sydney made available to the Cancer Research Committee beds for the treatment of patients suffering from cancer. The University also offered to instal in the hospitals deep therapy X ray machines together with a skilled staff to carry out treatment of patients on the advice of a radio-therapy subcommittee. Two deep therapy machines have now been installed, a Victor-Snook machine at the Royal Prince Alfred Hospital and a Gaiffé Gallot apparatus capable of giving a current of 30 milliampères at 250 kilovolts at the Bio-physical Laboratory of the University.

The University of Sydney agreed to purchase two grammes of radium in order to carry out the treatment of patients and therapeutic research. Through the foresight of the Commonwealth Government ten grammes of radium have been purchased and made available to the various States of Australia for the treatment of cancer patients. The Commonwealth has brought Dr. Arthur Burrows again to Australia to superintend the use of radium. A radium clinic has been provided from the Cancer Research Fund at the Royal Prince Alfred Hospital, Sydney.

Early in 1927 the University of Sydney took steps to obtain the services of a director of cancer research and after much deliberation the Senate finally decided to appoint two directors, a director of cancer research and a director of cancer treatment. The new directors took up duties on June 1, 1928. In 1927 Mr. R. K. Newman was appointed to prepare colloidal lead. He has made a study of the various methods that may be employed and has endeavoured to increase our knowledge of the characteristics of this fluid. During 1928 Dr. E. S. Horning commenced cytological investigations. He has further made a series of studies of the transplantation of

the sarcoma in mice. This work is being further encouraged lately by the appointment of Mr. K. E. Richardson, B.Sc. During the latter part of 1928 treatment advisory subcommittees have been organized by the Royal Prince Alfred Hospital, the Sydney Hospital and the Saint Vincent's Hospital. An endeavour is made to bring every patient suffering from cancer before this committee which discusses the best means of treatment and then sends the patient to the appropriate surgeon or physician. Steps are being taken to insure that adequate records are kept of the progress of these patients. In order that satisfactory classification of new growths may be made, Professor D. A. Welsh has undertaken to coordinate this work and Dr. Arthur Welsh has been appointed to work at pathology for the Cancer Research Committee.

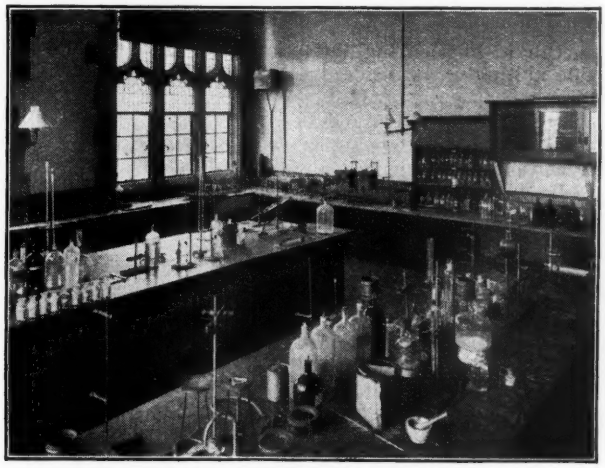
PHYSIOLOGICAL LABORATORIES OF THE UNIVERSITY OF SYDNEY.

By H. PRIESTLEY, M.D., Ch.M., B.Sc. (Sydney),
Acting Professor of Physiology.

WHEN the Medical School was built in 1887 the provision for research work in physiology was a chemical laboratory, an experimental laboratory and a histological laboratory. In 1910 the department of physiology was greatly enlarged and several extensions have been made since.

Equipment.

The present provision for research work consists of three rooms for chemistry, with large dark-room and balance room, two rooms for experimental physiology with dark-room and a room for metabolic research. The rooms for chemistry make up a suite with two large rooms with wood and slate benches, fume chambers, water baths, ovens *et cetera* for general work, a smaller room between them with slate benches and a large fume chamber, muffle furnace, still *et cetera* and a dark-room and balance room. The rooms for experimental physiology are in general like those for chemistry, but there is shafting for power driven by a large Thirlmere water motor on one of the slate benches.



Physiological Laboratory in the University of Sydney.

In addition there is a first-class workshop with large lathe, watchmaker's lathe, drill and all other machinery necessary for making fine instruments. The greater part of the instruments used in the department are made here by a skilled instrument maker.

Equipment on the bio-chemical side is very good; the modern balances include a chainometric balance and an assay balance and a large balance capable of weighing up to fifty kilograms, graduated to 0·05 gramme. There are also high-class spectroscope, polarimeter, refractometer, calorimeters and other apparatus of this type, together with a full range of ordinary chemical equipment.

On the experimental side the equipment is not so good. There is a large Palmer kymograph and a number of smaller kymographs of different types.

In the metabolism room there is the usual apparatus for the determination of basal metabolic rate by the Douglas bag method and also two types of Benedict apparatus.

For optical work there is a high-class optical bench, a good range of microscopes and an Edenger and a Zeiss microprojection apparatus. All the rooms have recently been fitted with convenient electric points.

Staff.

The full staff consists of a professor, an associate professor, four full-time lecturers and two part-time demonstrators. All are supposed to engage in research, but the exigencies of teaching do not leave as much time as is desirable for research work. A number of post-graduate research workers is engaged in the dedepartment, including three cancer research bio-chemists and two science research scholars.

Nature of Investigations.

At the present time investigations are being carried out upon basal metabolism, food consumption of Australian school girls, vitamins, phosphorus distribution in muscles, metabolism of frogs, hydrogen ion concentration of sea water in relation to fauna, blood groupings, the effect of X rays and radium on the general metabolism of exposed subjects, the pharmacology of plants poisonous to stock, the effect of exercise on the pulse, the distribution of lead and other metallic elements in tissues. Voluntary workers who show a genuine desire to make investigations of a physiological or bio-chemical nature, are welcome in the department. The University charges a fee of £5 5s. per term for each research worker to help towards the cost of maintenance. Within the limits of a rather restricted income

the department pays for most of the material and apparatus required for reasearch, but the research worker may be called upon to pay for any expensive apparatus or material he requires.

THE DEPARTMENT OF PATHOLOGY, SYDNEY HOSPITAL.

By KEITH INGLIS, M.D., Ch.M. (Sydney),
Director and Morbid Anatomist.

PRIOR to 1888 the pathological work required in the general administration of the Sydney Hospital was performed by various members of the medical staff, chiefly the resident medical officers; in 1883 it was suggested that a resident pathologist and registrar should be appointed to relieve the resident medical officers of this part of their duties, but no action was taken. The project remained in abeyance until 1888, when Dr. W. C. Wilkinson was appointed honorary pathologist. Pathological work was then carried out in the building erected for a steam laundry, where *post mortem* and other examinations were made.

In 1898 a special building for pathology was opened and since then the progress of pathological research has been steady, largely due to the fostering care of the late Sydney Jamieson.

The hospital has been fortunate in securing the services of unusually capable graduates as resident pathologists, the list including such men as J. L. T. Isbister, C. V. Bowker, H. S. Stacy and A. J. Aspinall. A perusal of the list of pathologists supports the contention that a year's experience in pathology provides an excellent foundation for a graduate who intends subsequently to practise clinical medicine in one of its branches.

Up to 1920 all graduate members of the staff of the department were honorary, but in 1920 a salaried part-time appointment was made for the first time. This experiment proved a success and since then three other salaried part-time appointments have been made. The present staff includes myself as morbid anatomist and director, Dr. H. S. H. Wardlaw, bio-chemist; Dr. C. H. Shearman, serologist and Dr. Marjory Little, bacteriologist. All of these four officers hold part-time appointments. Dr. Wardlaw and I occupy the remainder of our time in teaching at the University, whereas Dr. Little and Dr. Shearman in addition to hospital duties carry on private practice as pathologists.

The remaining members of the staff hold full-time appointments; these include senior resident pathologist (Dr. E. B. Jones), junior pathologist (non-resident, Dr. F. M. Voss), two trained sisters, four trained laboratory assistants, a boy and a cleaner.

The building at present occupied by the department is old and out of date, but steps are being taken to provide more extensive accommodation in the near future. The laboratory space is so restricted that no provision for voluntary workers is available at present, but it is the policy of the hospital to encourage voluntary workers and this will be done as soon as a new building for pathology is erected.

Members of the staff of the department for pathology keep in touch with the clinical staff as far as possible, but even closer collaboration than has been possible hitherto is desirable.

Some research work has been carried out by members of the staff. This work has mostly been concerned with material that has been studied during the course of routine examinations.

The department contains a small library, a museum of morbid anatomy and a large collection of histological preparations including over 15,000 sections and 10,000 paraffin blocks; a card index is used in the classification of these preparations which are classified according to diseases.

DEPARTMENTS OF PATHOLOGY AND BIO-CHEMISTRY AT THE ROYAL PRINCE ALFRED HOSPITAL.

By A. H. TEBBUTT, B.A., M.B., D.P.H.
AND
F. S. HANSMAN, M.B., Ch.M., M.R.C.P.,
Honorary Directors.

Historical.

THE ROYAL PRINCE ALFRED HOSPITAL was formally opened on September 25, 1882, that is to say just before the bacteriological era in medicine which was to be so fruitful in the discovery and cultivation of the bacteria causing infective diseases of man and domestic animals. This date also precedes the major developments of clinical pathology and is antecedent by a whole generation to the creation of bio-chemical departments in our public hospitals. Therefore, we find that in the early years of this hospital *post mortem* examinations were the principal functions of the pathological department which consisted of two rooms and a small mortuary situated in the hospital grounds at some distance from the main hospital pavilions and over the entrance was the inscription *"in caelo quies"* which stands unto this day.

Dr. J. T. Wilson, later Professor of Anatomy, was the first honorary pathologist and was followed by Dr. George Rennie who took great interest in *post mortem* findings. During this period some investigations were carried out in the hospital, notably by Dr. Graham, later Sir James Graham, on hydatid disease, also by Dr. George Rennie and Dr. Cecil Purser on the *appendix vermiformis*. Later on in the 'nineties Dr. Camac Wilkinson returned from Europe with much enthusiasm for the new bacteriological studies and was appointed honorary pathologist. No resident medical officer was specially assigned to the duties of resident pathologist until 1898, when this honour fell to Dr. John MacPherson and it is interesting to note that his immediate successors were Dr. Cosh, Dr. Lipscomb, Dr. Sandes and Dr. Cleland, all men who have won distinction in their profession.

In the year 1902 the newly-appointed Professor of Pathology in the University, Professor D. A. Welsh, was appointed honorary pathologist to the hospital. Coming from Edinburgh University, a distinguished centre for pathological studies, Professor Welsh saw at once the inadequate facilities in the light of recent advances in laboratory investigations and successful representations were made to the existing colonial government for a special grant in 1903. The late T. P. Anderson-Stuart and Professor Welsh supervised the plans of the present buildings on the same site, but they were not completed and occupied until 1906-1907.

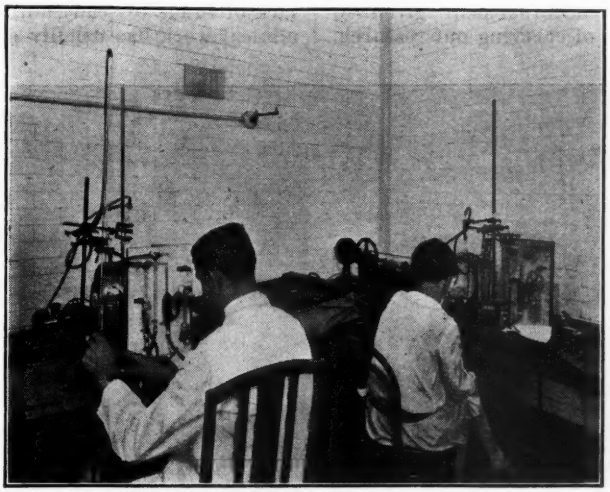


FIGURE I.
Laboratories for Analysis Room.

Until 1905 no statistical report of the work in the laboratories was included in the hospital report. In this year, however, we find that there were 878 pathological reports and 72 autopsies and the increase in the volume of work in twenty-two years may be gathered from the report for 1927 in which year there were 14,763 pathological, 5,556 bio-chemical reports and 258 autopsies.

It was not long before Professor Welsh sought for assistance to extend the scope of laboratory work by the appointment (1908) of a pathological chemist, Dr. H. G. Chapman, and to insure the teaching of *post mortem* pathology by the appointment (1908) of assistant pathologists (Dr. Barling and the late W. F. Litchfield). And so the work and the staff have increased from these earlier years until the present day, but we shall pass now to the main object of this article, namely a consideration of the present conditions and the immediate objectives of these departments and the opportunities they offer for the benefit of young graduates and others about to enter the profession.

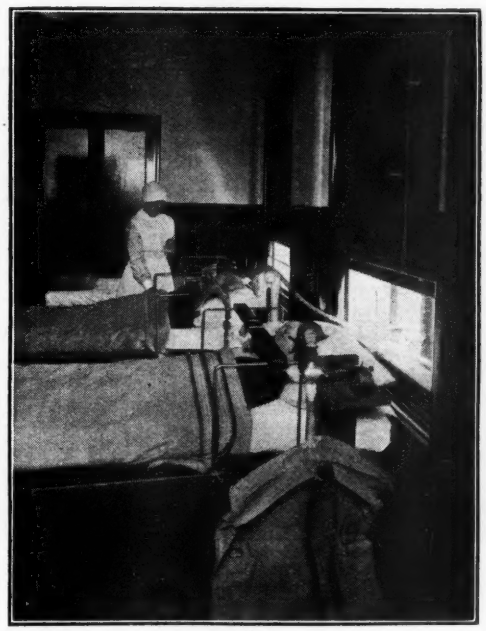


FIGURE II.
Basal Metabolism Laboratories. Patients under test.

Organization.

There are two departments, pathology and biochemistry, each with an honorary consulting staff and an honorary director. The department of pathology is subdivided into bacteriology and morbid anatomy, each with an experienced full-time non-resident graduate in charge and his own technical assistants. The senior resident medical officers in rotation spend some of their time attached to these departments. The department of biochemistry is organized in the same way.

Salaries.

The morbid histologist and the bacteriologist at present each receives £700 *per annum* rising to £800 in the second year, whilst the biochemist receives £400 during the first year. The resident medical officers in the department receive the same salaries as other resident medical officers.

Buildings.

The present buildings have stood with minor additions and many interior alterations for twenty-one years and are now overcrowded and inadequate, but more important still, they are too far away from the wards. The need for close cooperation between the clinician, the pathologist and biochemist is generally accepted. The governing body and the medical staff are fully alive to the necessity of carrying out this work in closer proximity to the wards and it is hoped that ample accommodation in the main hospital block will be provided before very long.

Objectives.

The laboratories of a large general hospital and clinical school should subserve three purposes.

Their first and essential purpose is that in them efficient and well-trained workers shall do all

routine laboratory investigations found to be useful to the clinician in diagnosis and prognosis.

In the second place under arrangements made by the University, the students should receive instruction in clinical pathology and bio-chemistry.

In the third place facilities should be provided for research and every encouragement given to approved persons desirous of carrying out research. In addition, therefore, to the diagnostic laboratories there should be students' laboratories, a central laboratory for teaching purposes, research laboratories and a museum.

FIGURE III.
Bacteriological Laboratory.

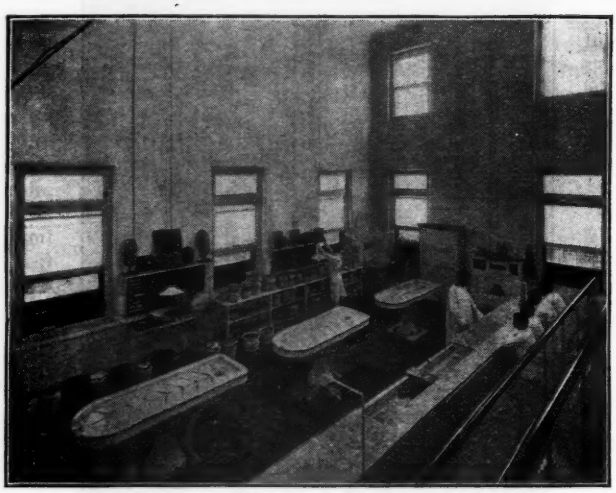


FIGURE IV.
Post Mortem Room.

Opportunities.

Hospital Appointments in Clinical Pathology and Bio-Chemistry.

Students should endeavour to benefit as much as possible during their hospital curriculum from the large amount of pathological material which is available to them. To some the opportunity will never again present itself. They should consider carefully the pathological and bio-chemical reports on the patients they attend and should not hesitate to question the pathologist or clinician upon the findings and their relative value in diagnosis, prognosis and treatment. In many cases the material is available for their own examination, but it is too often neglected. It is admitted that the student is not solely to blame. Too little attention has been paid to the teaching of clinical pathology in hospitals. The routine work does not leave sufficient time for the hospital pathologists and no adequate provision has yet been made for a teaching laboratory or its equipment. Tutors in pathology and bio-chemistry are as necessary as tutors in medicine or surgery. Consideration of this problem has not been forgotten and it is hoped that a solution will soon be found.

Notwithstanding these difficulties capable resident pathologists have worked in the department from time to time and have done useful work. The lack of immediate opportunities for advancement or the lack of funds to study abroad or the easier path to clinical work has usually diverted them from pathology. Students and young graduates should note, however, that opportunities for them are slowly but surely increasing, but higher qualifications are also expected of candidates than heretofore.

Research.

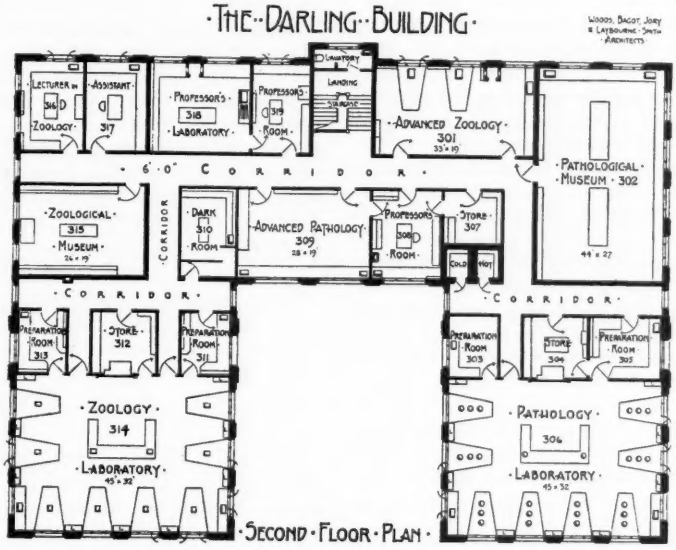
Up to the present time there has not been any endowment of research scholarships or fellowships at this hospital. There have been private research workers or workers from other institutions temporarily working here. Just recently, however, under a university endowment by Dr. Gordon Craig, Dr. A. Bolliger, Ph.D. (Basle), has been appointed Director of Urological Research in the Urological Department and has commenced research work in the Pathological Department.

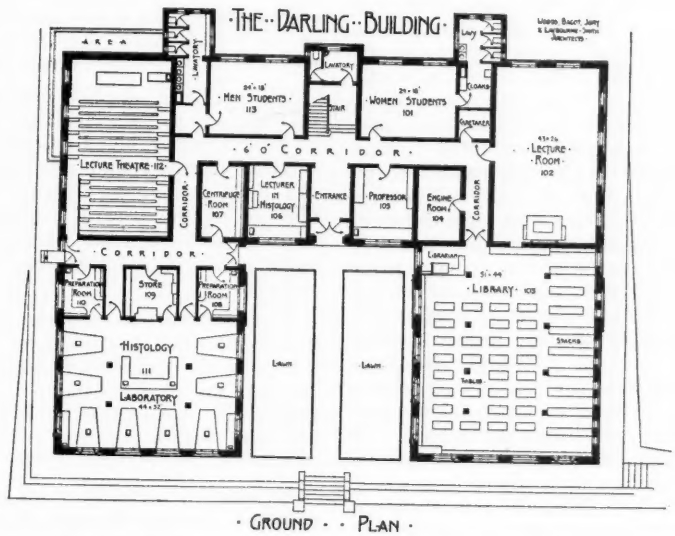
It must not be thought, however, that no research has yet been done. Quite a number of original papers and reports have come from workers in this hospital, but the work has not been done under any research organization. It is quite certain that research appointments or scholarships will be created in the future and we should not neglect the fact that further accommodation will be required. It is to be hoped that for the welfare of medical research in Australia the most ingenious and inquiring minds amongst our students and young graduates will be attracted or directed thereto.

THE PATHOLOGICAL DEPARTMENTS OF THE UNIVERSITY OF ADELAIDE AND THE ADELAIDE HOSPITAL.

By J. B. CLELAND, M.D., Ch.M. (Sydney),
Professor of Pathology.

THE pathological and bacteriological laboratories of the University and the Adelaide Hospital are so intimately associated that they must be looked upon as one unit, though technically under separate jurisdictions. The teaching of medical students in these subjects has been carried out in the course of time first entirely at the University, then entirely at the Adelaide Hospital laboratory and now at both places, the purely systematic teaching taking place at the Darling Building in the University and the clinical and *post mortem* work being conducted at the Adelaide Hospital.





At the University the accommodation consists of a large laboratory for practical pathology and bacteriology, with a museum which is divided into two sections. What is called the "students' museum" contains typical pathological specimens, renewed frequently, which are handled by the students themselves after having been used for demonstration purposes and to which students can have access at any time. The University museum proper contains nicely mounted specimens collected over many years, many by Sir Joseph Verco and Professor Watson, a number now of historic importance. In addition are the necessary rooms for the accommodation of the Professor and his assistants and a special laboratory where investigational work can be carried out. The Professor of Pathology is responsible for instruction in pathology and bacteriology to medical and dental students and in dental pathology to the latter. He is assisted in his University work by a half-time demonstrator who is necessarily a qualified medical practitioner, as well as by skilled technical assistants.

The laboratory at the Adelaide Hospital is under its Director, Dr. Lionel Bull, the Professor of Pathology being an honorary officer of this laboratory as well as holding the position of Honorary Pathologist at the Adelaide Hospital. A qualified medical graduate acts as assistant to the Director. A bachelor of science takes charge more particularly of bio-chemical work and there is a skilled technical staff as well as the necessary attendants for cleaning up and attending to the animals, which include besides guinea pigs and rabbits, sheep, horses, cattle and at times pigs.

Whilst there is still some room available for extra workers in the University laboratory, the accommodation at the Adelaide Hospital has been for long inadequate. Authority has, however, now been granted to proceed with necessary additions and alterations which will enable work to be carried on more satisfactorily. Within a few months ample accommodation for the Adelaide Hospital museum should be available. This museum now contains over 2,700 specimens and is daily increasing in importance. The museum at the University is considered as practically closed, nearly all additions now being made to the museum at the Adelaide Hospital.

The University and the Adelaide Hospital have collaborated in investigational work. This was especially noticeable in the gastro-enteritis investigations carried out by Dr. F. Beare. As most of the material for investigation comes through the Adelaide Hospital, most work of this nature has been carried on there. Here may be pointed out the exceptionally fortunate position in which the Adelaide Hospital laboratory is placed. Its Director has had very extensive experience in dealing with pathological and bacteriological material from human beings and is also a qualified veterinary man. He is responsible for all pathological investigations into diseases of stock in South Australia which come through the stock department of the State. Many of these diseases in animals have a more or less direct bearing on investigations into disease in man. Dr. Bull's work on rickets in foxhound puppies has been quoted all over the world. He has carried out many observations on deficiency diseases in animals, on habronema nodules, on botulism and on various diseases of unknown ætiology. It seems quite clear that much of the advance that will be made in the future in unravelling the ætiology of human diseases, will be accomplished through the study of similar diseases in animals. The Adelaide Hospital is in the forefront of such work and at present under Dr. Bull there is one special officer working for the Council for Scientific and Industrial Research and another is about to be appointed by the stock department.

A large and important piece of work is being undertaken in the pathology department at the hospital namely an investigation into the various lesions met with in autopsies. These are systematically entered on cards, the entry under any one lesion, say gastric ulcer, being accompanied by a summary of all other lesions of importance met with in the body. In this way associated lesions may be recognized which might otherwise escape detection. Usually about four to five card entries are required for each *post mortem* examination, but occasionally the number may reach ten. A series of one thousand *post mortem* examinations has been tabulated in this way and a second is now nearing completion. The tabulated results under their various headings are appearing in the *Medical and Scientific Archives of the Adelaide Hospital* where they will be available for workers elsewhere who are in search of collective information upon any of the pathological conditions dealt with. A reference to rare diseases and unusual combinations will thus be available and a monographer from other parts of the world can, if he thinks fit, communicate with the Adelaide Hospital authorities for further information about any case which may arouse interest.

The Professor of Pathology being responsible for the instruction given to dental students in the pathology of the teeth, this has enabled him, supplemented with his *post mortem* material, to acquire a practical grasp of the subject denied to dentists who have not had these facilities. It is clear that important work can be done here by an investigator who is prepared to devote sufficient time to the subject.

Though the facilities for investigational work as regards laboratory accommodation are not great, room has hitherto always been found for the graduate seriously desirous and capable of carrying on research work leading to additions to scientific knowledge. The University authorities have always welcomed such investigators. At the Adelaide Hospital laboratory the congestion has made it difficult to find suitable accommodation, but this in the near future will be partly rectified. A graduate desirous of working at the Adelaide Hospital would necessarily have to receive the permission of the Adelaide Hospital Board. This body has in the past and will unquestionably in the future facilitate research work in every way within its power.

THE PATHOLOGICAL LABORATORY AT THE CHILDREN'S HOSPITAL.

By REGINALD WEBSTER, M.D. (Melbourne), D.Sc. (Melbourne),
Pathologist.

IT has always been the objective of the Pathological Department of the Children's Hospital, Melbourne, to maintain research study concurrently with the discharge of the routine duties of a hospital laboratory. Laboratory workers will appreciate that such a programme is not always easy to fulfil, but if the routine work be carried out in such a manner that it has scientific value, a measure of progress towards the ideal is achieved.

Based on the application of this principle communications to THE MEDICAL JOURNAL OF AUSTRALIA on poliomyelitis, blood culture in summer diarrhœa, lumbar puncture and meningitis have appeared in the past. Articles dealing with the relative incidence of the several serological races of pneumococci and the mode of transmission of pneumococcal infection have also emanated from this laboratory.

In collaboration with the workers of the Walter and Eliza Hall Institute we undertook a detailed study of the types of dysentery bacilli implicated in acute infective colitis of infancy and in a further publication we endeavoured to assess the value of scientific serum therapy in the bacillary dysentery of infancy and childhood.

Exhaustive investigations on the value of the commonly accepted renal efficiency tests as applied to children were carried out by Dr. Robert Southby during his term as Assistant Pathologist.

Current research work is directed towards the differentiation of human and bovine strains of tubercle bacilli as they occur in the multiform manifestations of tuberculosis in childhood. In particular the incidence of tuberculous infection of the tonsil and its relation to tuberculous cervical adenitis is under investigation. Histology, cultural

methods and virulence tests in animals constitute the three lines of attack being directed upon this problem.

The existing pathological block was built in the year 1913. Prior to that time the institution was not self-contained in respect of its pathological work, the bacteriological and histological work being discharged in an honorary capacity by the late R. J. Bull at the University of Melbourne and the autopsies by the honorary Pathologist, Dr. H. Douglas Stephens who was assisted by the resident medical officers.

The erection of a substantial building comprising laboratories, *post mortem* room and pathological museum marked the inception of a big forward movement in the pathological work of the hospital.

Early in 1927 the committee of management expended a bequest from the late Mrs. John Turnbull, a former president of the hospital, in providing extra laboratory accommodation and a well designed and hygienic animal house. On the upper floor of the main building are three laboratories, a room devoted to the preparation of culture media, one reserved for the natural colour preservation and mounting of museum specimens, the necessary adnexa for the cleaning and sterilization of apparatus and a waiting room for such children as are referred to the Pathological Department for clinico-pathological investigation. The ground floor is divided into pathological museum, *post mortem* room, mortuary and viewing room.

During the first six months of 1914 Dr. D. M. Embelton worked in the new laboratory on a half-time basis. In June, 1914, the writer was appointed as a full-time salaried officer with one lay assistant. Through the intermediate stage of a half-time qualified assistant the staff has attainted its present complement of senior Pathologist, junior Pathologist, trained technician and two laboratory boys, all of whom work whole time. The immediate reasons for the appointment of a whole-time junior Pathologist were the erection of the new baby wards and the amplification of the medical curriculum, by which students were required to attend the hospital in groups, for the whole day over a period of six weeks.

The position of junior Pathologist is at present held by Dr. J. M. Fone.

The committee of management of the Children's Hospital have always taken a long-sighted view of the needs of the pathological laboratory. For the various research studies and the advances in maintenance cost which inevitably follow increasing activity, funds have always been made available.

Obviously if research work is not to be embarrassed by the common task and daily round, it is necessary to establish a research wing in which the workers are in no way responsible for the day-to-day routine except in so far as it might bear on the particular studies on which they are engaged. At the same time the institution and upkeep of a purely research establishment can hardly be regarded as a fair charge upon the general maintenance account of the hospital and until a benefaction specifically for this purpose is forthcoming, the ideal will not be realized.

The annual expenditure by the committee on the laboratory as at present constituted is approximately £2,500, of which sum £1,700 represents salaries and wages. The consideration invariably extended by the committee has in the past proved a great encouragement to those responsible for the work of the Pathological Department.

DEPARTMENT OF UROLOGY, ROYAL PRINCE ALFRED HOSPITAL.

By GORDON CRAIG, M.B., Ch.M. (Sydney), F.C.S.A.,
Director of the Department of Urology at the Royal Prince Alfred Hospital.

THE Department of Urology at the Royal Prince Alfred Hospital was formed over two years ago in conjunction with the University of Sydney with the object of providing: (i) routine treatment of patients in hospital as well as out-patients, (ii) the teaching of undergraduates, (iii) the teaching of post-graduates, (iv) research in problems of genito-urinary disease, in their clinical, pathological, bacteriological and bio-chemical aspects.

The first heading is self explanatory.

The Teaching of Undergraduates.

Each student in his senior years has the opportunity of seeing the use of the special instrumental means of diagnosis in genito-urinary diseases. Under guidance of the teaching staff he sees for himself through the cystoscope the main manifestations of disease in the bladder and urethra. He is allotted a certain number of beds to which he has to act as a clinical clerk. The history taken by him is supervised by the members of the teaching staff who give him instruction in the relative value of clinical history, a routine clinical examination, the indications for special methods of examination by cystoscope combined with X ray investigation. The various methods in ordinary use for the estimation of renal function are demonstrated.

No attempt is made to emphasize the importance of genito-urinary disease as compared with disease in other parts of the body, but rather is he taught those things which will help him to decide when it is safe to treat a patient along general lines and when it is necessary to use special methods of investigation to arrive at an accurate diagnosis.

Post-graduate Teaching.

The candidate for post-graduate training in this special branch of surgery must sign an undertaking to serve the hospital for three years, as a junior, intermediate and senior fellow in urology. The fellowship is provided by a University endowment and amounts to £100 *per annum* with board and residence in the hospital. In the first year he is occupied in the study of disease in the ambulatory patient in the out-patient department; during the second year he is responsible for the pre-operative

and post-operative treatment of the in-patients; in his final year he is given the opportunity of performing under the observation of the honorary surgeon all the classical operations in this special branch of surgery. Throughout his whole term of three years he is encouraged and given facilities to carry out research in any aspect of his work.

A candidate to be eligible for a fellowship in urology must be a graduate of a recognized university in any part of the world. He must have held a resident medical and surgical appointment for at least one year in a hospital of over one hundred beds. In future appointments will commence from the beginning of the University academic year, in October. All applications must be sent in to the Registrar of the University of Sydney not later than May 31. The application must be made out on the form supplied on request to the University.

Research.

On the foundation of the department research facilities were provided at a fully equipped laboratory situated at some distance from the hospital, but within the last three months the Board of Directors of the Royal Prince Alfred Hospital have provided accommodation for research within the grounds of the hospital itself. Any disabilities that the research workers suffered from have now been removed. They have now the opportunity of working alongside those who are engaged in other forms of research in pathology of all regions of the body. Any tendency to narrowing in their outlook in disease is neutralized by the healthy criticism that will arise from their colleagues.

The method of attacking a problem in research requires guidance and training. This guidance has been provided by the appointment of Dr. Bolliger, by the Senate of the University of Sydney, as Director of Research in Urology. Up to his appointment to this department he was bio-chemist to the Henry Ford Hospital at Detroit. He has made several contributions within recent years to the literature of his subject. To sum up, the Department of Urology at the Royal Prince Alfred Hospital is now equipped to fulfil all the standards of treatment, teaching and research as practised in the great teaching hospitals of England, Europe and America.

The Medical Research Council.

THE work of the Medical Research Council is well known to the medical profession throughout the British Empire. Nearly every practitioner knows that the Council publishes some very valuable reports called service publications. Some are aware that the Medical Research Council was created in 1920 to take over the duties and functions of the Medical Research Committee. The constitution of these bodies, their defined objects, the manner in which they conduct their business and the part they have played in the promotion of research in the Empire are less well known. It is therefore held to be of interest to present in this place the salient facts concerning the leading organization in Great Britain for the coordination and encouragement of medical research.

Historical.

When the *National Insurance Act* became law in Great Britain in 1913 the sum of one penny was provided out of the consolidated revenue for a purpose involved in the term "sanatorium benefit." This contribution amounted in the aggregate to £57,000 a year. In accordance with the act the National Health Insurance Joint Commission was required to organize a department for the specific purpose of extending the knowledge possessed of the nature and causes of tuberculosis and other diseases. In order to make the best use of the money available the matter was referred to a committee under the chairmanship of the Honourable Waldorf Astor, M.P., and as a result of the recommendations of this committee the Medical Research Committee was formed under the chairmanship of Lord Fletcher Moulton of Bank. Early in 1914 Dr. W. M. Fletcher was appointed secretary to the committee. The other members of the Medical Research Committee, as this committee was called, were prominent scientists and two distinguished men selected for their financial and administrative ability. The committee was directly responsible to the Commissioners and later to the Minister of Health who became chairman of the National Health Insurance Joint Committee. The executive powers of the Medical Research Committee were defined in the *National Insurance Act* and were relatively wide. At first the plan was put forward that research should be coordinated and controlled from a central institute. A counter proposal was made that the committee should work on a decentralized scheme and that by a system of endowments spread throughout the country, a very wide net should be cast. It was thought that in this way the growth of the medical research world would be rapid and that recruits for this kind of work would be won without difficulty. Late in the year 1914 a meeting of the members of the Lister Institute of Preventive Medicine was called to consider a proposal to amalgamate with the Medical Research Council. The proposal was defeated by thirty-nine votes to thirty-two votes in favour. There is reason to believe that if the Medical Research Committee had been in favour of the proposal, the Lister Institute would have been handed over in its entirety to serve as the central institute of the committee. There was, however, another movement under consideration. Some of the members of the committee advocated the purchase of a hospital for consumptives, the Mount Vernon Hospital, in Hampstead for the purpose of the control of some of the work. The problems connected with the war disturbed many of the early plans, but there was no necessity to alter the original scheme of having five main departments. The first was the department of bacteriology. When

Mount Vernon Hospital was acquired, some work was conducted in the unadapted rooms. Later Sir Almroth Wright's laboratories at Saint Mary's Hospital were utilized for the purpose and some of the work was conducted at the No. 13 General Hospital at Boulogne. The department of bio-chemistry and pharmacology was placed under the care of Dr. H. H. Dale. The work was carried out at the Lister Institute. The third was the department of applied physiology under the control of Professor Leonard Hill. He worked at first at the London Hospital and later at the Lister Institute. The fourth department was concerned with statistics under the late John Brownlee. The headquarters of this department were at the British Museum. The last department was that of clinical research. Dr. (now Sir) Thomas Lewis was placed in charge and in the early years the research was conducted at the Hampstead General Hospital. It thus appears that the work undertaken directly by the salaried officers of the Committee was concentrated in five departments housed in four institutions in London. Workers were subsidized in other parts of the United Kingdom and English, Scottish and Irish laboratories were aided by the committee. It is not our intention to trace the work attempted and accomplished during those early years. Some very valuable reports were issued on medical problems more or less associated with war. In 1917 the Medical Research Committee lost £7,000 of its income as a result of compulsory enlistment; those who were required to serve in the forces, were exempted from the provisions of the *National Insurance Act*. At the end of the war it was evident that the scheme of medical research did not fit in well with the organization of national health insurance. A modification of the constitution of the committee was therefore considered and on March 11, 1920, a committee of the Privy Council was appointed comprising the President of the Privy Council, the Minister of Health, the Secretary for Scotland and the Chief Secretary for Ireland for the purpose of performing the duties previously carried out by the Medical Research Committee. This committee drafted a charter for the creation of a corporate body to be known as the Medical Research Council. The members of the first Medical Research Council were Viscount Goschen, the Honourable E. F. L. Wood, M.P., W. Graham, M.P., Dr. C. J. Bond, Dr. W. Bulloch, F.R.S., Dr. T. R. Elliott, F.R.S., Dr. H. Head, F.R.S., Dr. F. Gowland Hopkins, F.R.S., Major-General Sir W. B. Leishman, F.R.S., and Dr. Noel Paton, F.R.C.. The charter gave the council power to sue and be sued, to enter into contracts, to hold and dispose of money and property, to accept trusts and to own lands, tenements and hereditaments in the United Kingdom to a value not exceeding £50,000. At intervals of two years three members were required to retire, but they were eligible for reappointment. The members appointed as representatives of the House of Lords and the House of Commons would be required to vacate their offices on the council if they were no longer members of Parliament. Casual and other vacancies were to be filled by the committee of the Privy Council after consultation with the President of the Royal Society and with the Medical Research Council. The council had power to appoint officers and servants and to fix their remuneration. The moneys required by the Medical Research Council were provided by Parliament each year. All the members of the Medical Research Council except those who were members of either House of Parliament, were paid for their services.

The Medical Research Council established the National Institute for Medical Research. In 1919 the Medical Research Committee recovered the occupation of Mount Vernon Hospital which had been taken over by the War Office and later by the Air Force for war purposes. The work of alteration to adapt the buildings and grounds to the purposes of medical research was started in 1920. In 1919 the department of statistics and that of publications were transferred to Hampstead. In 1920 the departments of bacteriology, of bio-chemistry and pharmacology and of applied physiology were removed from the Lister Institute and Saint Mary's Hospital. In the course of time several committees had been appointed for special purposes. There were two dealing with tuberculosis, one dealing with shock, one dealing with ante-natal and post-natal problems of child life, one dealing with rickets, one dealing with the accessory food factors, one dealing with salvarsan, one dealing with human nutrition, one with the clinical uses of oxygen, one with the medical problems of flying, one with the injuries of the nervous system, one with the cinchona derivatives and malaria, one with the properties of hæmoglobin, one with miners' nystagmus, one with biological standards, one with pathological methods, one with anthropometric methods and standards and one with *status lymphaticus* and the causes of unexplained death. In addition the Industrial Fatigue Research Board was appointed jointly by the Department of Scientific and Industrial Research and the Medical Research Council.

The department of clinical research was developed by the Medical Research Committee from 1917 and by the Medical Research Council from 1920. It was held that proper facilities for the training of students in original clinical work and for utilization of the material available at the medical schools and hospitals were lacking. The institution of medical and surgical units at University College Hospital, at Saint Bartholomew's Hospital, at the London Hospital, at Saint Thomas's Hospital, at the Research Institute at Saint Andrews and to some extent in private practice at various centres is the result of the recognition by the research bodies of this defect.

In 1926 a further modification was made in the constitution of the Medical Research Council. As a result of the change in the constitution of Ireland it became necessary to alter the composition of the committee of the Privy Council. The personnel of the committee is prescribed as follows: the President of the Privy Council, the Secretary of State for Home Affairs, who is required to look after the interests of Northern Ireland, the Secretary of State for Dominion Affairs, the Secretary

of State for the Colonies, the Minister of Health for England and Wales and the Secretary of State for Scotland. At the same time the charter was amended in several particulars. The number of members of the Medical Research Council was increased to eleven and new conditions in regard to retirement and eligibility for reappointment were introduced.

In recent years the grant in aid provided by Parliament has amounted to £135,000 a year. The administrative expenses have reached the sum of £9,000 a year, the upkeep of the National Institute for Medical Research costs some £46,000 a year, while £80,000 is expended each year in research grants and for similar purposes. The latest list of members of the Medical Research Council is as follows: the Right Honourable the Earl of Balfour, F.R.S., chairman, the Right Honourable Lord Mildmay of Flete, treasurer, the Right Honourable William Graham, M.P., Sir Hugh K. Anderson, F.R.S., Professor E. P. Cathcart, F.R.S., Professor G. Dreyer, F.R.S., Professor T. R. Elliott, F.R.S., Sir Archibald E. Garrod, F.R.S., Sir Frederick Gowland Hopkins, F.R.S., Sir Charles J. Martin, F.R.S., Sir Charles S. Sherrington, F.R.S., and Sir Walter M. Fletcher, F.R.S., secretary.

Organization.

It will be gathered from the foregoing sketch of the history of the Medical Research Committee and the Medical Research Council that an attempt has been made to conduct medical research at a central institution by members of the staff appointed by the council and to initiate, encourage and endow research at universities, in clinics and elsewhere. The Medical Research Council is controlled by the committee of the Privy Council, but there would appear to be but little interference by the political masters of the Medical Research Council. The plan of partial centralization has been evolved by the erudite secretary, Sir Walter Fletcher, and by the original members of the Medical Research Committee. Sir Frederick Gowland Hopkins is the only member of the council at present, who served under Lord Moulton on the first committee. The National Institute for Medical Research at Hampstead has been given a *dependance* in the form of farm laboratories at Mill Hill. It has been the policy of the Medical Research Council to undertake work for Government departments, for bodies like the Dental Board of the United Kingdom, for the Empire Marketing Board, the Miners' Welfare Fund, the British Empire Cancer Campaign and the Distemper Research Council of the *Field* newspaper. These bodies contribute toward the cost of special investigations. A few private endowments have been made which the Medical Research Council administers. Within the past two years the Secretary of State for the Colonies has appointed on the recommendation of the Medical Research Council a colonial medical research committee. This body has the duty of advising both the Government and the Medical Research Council on the initiation and promotion of medical research in the interests of the British colonies, protectorates and mandated territories, on the recruitment and conditions of service of the necessary personnel and on the allocation and management of the money made available for these purposes. It will be remembered that early in 1927 the Imperial Conference met for the first time and the subject of the organization of medical research work was discussed. There are indications of more than superficial coordination between the research organizations in the various British possessions and dominions. The Medical Research Council is endeavouring to establish an Empire research service. Whether it is proposed to exert influence from the home centre on the manner of conducting investigations or whether the Medical Research Council merely wishes to act as intermediator, in order to economize both energy and time by informing workers of the progress that is being made elsewhere, is not known.

The Medical Research Council maintains the national collection of type cultures. This collection was originally established at the Lister Institute by Dr. J. C. G. Ledingham. Specimen cultures of bacteria are sent to laboratories in all parts of the world. Standardized preparations of killed organisms and of agglutinating serum are distributed from the Standards Laboratory at Oxford. The Medical Research Council acts in collaboration with the Health Organization of the League of Nations in connexion with the standardization of preparations like "Insulin."

It would be necessary to enter into a very detailed description of the work of the several departments of the National Institute of Medical Research if we were to attempt to place before our readers a full account of the organization of the Council's undertakings. Apart from the large amount of space that would be occupied, this record would scarcely serve the present purpose. In this place we shall content ourselves with some broad indications of the methods employed at the National Institute for Medical Research. Each department is in the charge of a director who has a staff of paid workers and others attached to the department. In the department of bio-chemistry and pharmacology there are eight members of the staff under Dr. H. H. Dale and five attached workers, in the department of experimental pathology, bacteriology and protositology Captain S. R. Douglas has a staff of nine members and there are six attached workers. In the department of applied optics the honorary director, Mr. J. E. Barnard, F.R.S., has two assistants. In the department of applied physiology, Dr. Leonard Hill, F.R.S., has two members on his staff and there are three attached workers. There are thus twenty-five members of the staff working in the four departments named and fourteen attached workers. The department of statistics was previously under John Brownlee. His death in March of 1927 placed the Medical Research Council in a difficulty. Dr. Major Greenwood had been appointed Professor of Epidemiology and Vital Statistics at the London School of Hygiene and Tropical Medicine. It is

therefore proposed to transfer the staff from Hampstead to the London School of Hygiene and Tropical Medicine, so that Professor Greenwood may organize and direct the investigations. A close association has been established between the department and the statistical branch of the Ministry of Health. The department of publications and library is in the charge of a librarian. It is extensive and well planned.

It is claimed that there is free collaboration between the several departments and that it is the nature of the investigation that determines which workers are required to attack it. On the other hand it appears that the directors of the several departments are given a relatively free hand in the selection of the problems for investigation.

The department of clinical and experimental medicine has been under the direction of Sir Thomas Lewis at the University College Hospital. He has given whole-time service to the Medical Research Council. Working under him are one whole-time and two part-time assistants. At other hospitals the Medical Research Council provides part of the money necessary to maintain the units. Similarly contributory grants are made to the workers at the Field Laboratory at Sheffield, at the University and Royal Infirmary in Edinburgh and at the James Mackenzie Institute for Clinical Research at Saint Andrews.

Special committees have been appointed to deal with particular problems and each of these committees sets up schemes of research. The schemes are submitted to particular individuals at universities, hospitals or institutions at different cities throughout the United Kingdom. Part-time or whole-time grants are made to the selected workers. At the same time the committees organize their own investigations and nominate one or more workers to carry out the researches and to draft the reports. Usually the individual workers in receipt of grants in aid publish in the most suitable medical journals or magazines. The reports of the committees appear as special publications of the Medical Research Council.

The work is thus divided into three categories. In the first place there is the planned research conducted either at the National Institute for Medical Research or at the farm laboratory at Mill Hill or at University College Hospital by members of the staff of the Council. In the next place there is the work conducted by specially selected investigators acting as committees of the Council or on behalf of these committees. In the third place there is the work of persons engaged in research in all parts of the United Kingdom. The Council encourages this work by making grants and by providing the salaries or part of the salaries of one or more worker. This third division is very wide. The Medical Research Council gains a foothold in almost every institution at which research is conducted and takes some credit for the result. The subjects mentioned in the annual reports cover practically the whole of medicine and the list of names of workers is a very long one. Lastly mention must be made of work undertaken by organizations created jointly by the Medical Research Council and other bodies. Reference has already been made to the Industrial Fatigue Research Board, the Empire Marketing Board and the Distemper Research Council.

It is to be noted that the Medical Research Council exercises a very wide influence on original work in the field of medicine and hygiene in the United Kingdom. It is now extending this influence throughout the Empire. Some research is still being conducted independently of the Medical Research Council, but this is becoming appreciably less as years pass. Some of the work is planned in a skilled fashion and conducted under able superintendence and direction. In other instances the organization is less efficient and the coordination is faulty. That the Medical Research Council has become a national institution of extraordinary value under the able guidance of Sir Walter Fletcher cannot be denied. He is wise enough to refrain from all attempts to direct or even to influence the workers engaged on special subjects. He has induced his council to adopt a plan of attack and he has developed this plan in a remarkably logical and efficient manner. If medical research is to be controlled by any body or institution in Australia, it will be essential that that body or institution study the organization and work of the Medical Research Council.

Medical Education in Australia.

FOLLOWING our practice instituted eight years ago we are restricting the account of the medical curriculum at the three medical schools in Australia to a brief summary. The reader is referred to the full account published in June, 1925. In 1930 we propose to publish exhaustive articles dealing with the scheme of medical education at each of the medical schools. The number of students entering the medical profession has been small during the past few years. Compared with other countries there is no overcrowding of the medical profession in Australia. Our medical schools are prepared to take many more students than are at present enrolled. The education given is sound and is recognized throughout the British Empire as of a high standard.

THE MEDICAL SCHOOL AT THE UNIVERSITY OF SYDNEY.

Persons seeking enrolment as medical students at the University of Sydney must have passed the school leaving certificate examination or matriculation and must produce evidence of having passed an examination in elementary chemistry and physics. These subjects may, however, be taken at the end of the Trinity term of the first year. After admission to the school the student spends his first year receiving instruction in chemistry, physics, zoology and botany. The first degree examination at the end of the first year includes chemistry and

physics. Having passed this test, he proceeds to the dissecting room. The subjects of the second year are anatomy, physiology and histology. The same subjects are continued throughout the third year. The examinations held at the end of the second and third years, known respectively as the second and third degree examinations, form the tests of the student's knowledge of anatomy, bio-chemistry and physiology. If the progress has been satisfactory, he leaves the normal and passes over to the abnormal. In the fourth year he applies himself to the study of the pathology of disease and at the same time he attends lectures on surgery, clinical surgery and medicine. He leaves the medical school proper and starts to work at the Royal Prince Alfred, the Sydney or the Saint Vincent's Hospital. At the end of the year he has to present himself for examination in pathology. During the fifth year he continues to work under a physician or a surgeon at hospital and he adds to the list of subjects gynæcology, obstetrics, pharmacology, therapeutics and *materia medica*. He is then required to sit for his fifth degree examination at which his knowledge is tested in all the clinical subjects he has studied. His sixth year is reserved for special subjects in addition to medicine and surgery. He attends lectures and demonstrations and does practical work in dermatology, oto-rhino-laryngology, ophthalmology and psychiatry. He is required to take short courses in clinical pathology and bio-chemistry and to attend lectures in medical jurisprudence and medical ethics. He also studies diseases of children and refreshes his memory in obstetrics. His work is not confined to the general hospital at which he has become a regular student. He goes to one of the two women's hospitals, to the Children's Hospital at Camperdown, to the Psychiatric Clinic at the Royal Prince Alfred Hospital or at Broughton Hall. Having attended all the prescribed lectures and having served in the wards in the various prescribed offices, he is permitted to sit for his final examination, provided that he is twenty-one years of age and that he can persuade two responsible persons to certify that he is a person of good fame and character.

The final examinations are for the degrees of bachelor of medicine and bachelor of surgery. The fees for the whole course amount to £235. This includes hospital attendance and examination fees.

The degree of doctor of medicine and that of master of surgery can be taken by any graduate of medicine of two years' standing. For the former he presents a thesis on the results of original observations and work. The candidate must be prepared to sit at an oral examination and to be examined on medicine generally or on the subject of his thesis. For the degree of master of surgery he is examined in general surgery, surgical anatomy and pathology, operative surgery, clinical surgery and the special branches of surgery. A thesis must be submitted. The fee for the higher degree is twenty pounds.

The University of Sydney also grants diplomas in public health, in tropical medicine and in psychiatry. In each instance the candidate must have passed through a prescribed course of study and have carried out special work at selected institutions. The course in tropical medicine is held at the Australian Institute of Tropical Medicine. The candidate for the diploma in psychiatry must have served as a resident medical officer at a hospital for the insane. The fees for the diploma are ten guineas each and there is an additional fee of the same amount for the course at Townsville.

THE MEDICAL SCHOOL AT THE UNIVERSITY OF MELBOURNE.

The preliminary examination that must be passed prior to entrance at the Medical School of the University of Melbourne is the school leaving examination in English, mathematics and three other languages. When the student has satisfied the examiners that he possesses sufficient knowledge on which a medical education can be built, he enters the Medical School and spends one year studying chemistry, physics, zoology and botany. An examination on all four subjects is held at the termination of the year. In the second year the student enters the anatomy and physiology departments. The subjects are given as anatomy, embryology, histology, neurology, physiology and topographical anatomy. The same studies are continued through the third year. The work in the third year includes applied bio-chemistry, experimental physiology, the physiology of the special senses and pharmacology. The student must dissect two whole bodies. Before he can enter on the work of the fourth year he must pass the second professional examination in anatomy and physiology. In the fourth year lectures on pathology, bacteriology, *materia medica*, therapeutics and obstetrics and gynæcology are attended and the student carries out practical work in these subjects. He also takes advanced anatomy. Late in the year he starts medicine and surgery. In the fifth year he studies clinical medicine and surgery, obstetrics, gynæcology, pædiatrics, ophthalmology, oto-rhino-laryngology and dermatology. He is attached to the Melbourne Hospital or the Alfred Hospital or the Saint Vincent's Hospital for his clinical work in the wards and in the out-patients' departments. He has to attend twenty women in labour and for this purpose he goes into residence at the Women's Hospital. He learns the rudiments of psychiatry at one of the hospitals for the insane or at a reception house and he becomes familiar with the commoner infectious diseases at the hospital at Fairfield. In his sixth year he attends lectures on medical jurisprudence, medical ethics, psychiatry and operative surgery. At the end of the second term in the sixth year he presents himself for his final examination in medicine, surgery, clinical medicine and surgery, obstetrics and gynæcology.

The fee for the course, including that for the examination of bachelor of medicine and bachelor of surgery, is £234.

Higher degrees in medicine and surgery are granted to graduates. A thesis must be submitted or under certain circumstances the degree may be given on examination of the candidate without a thesis. The fee for each degree is twenty guineas.

Diplomas in public health and in tropical medicine, similar to those referred to above under the heading of the University of Sydney, are available to graduates who comply with the regulations.

THE MEDICAL SCHOOL AT THE UNIVERSITY OF ADELAIDE.

Admission to the medical school of the University of Adelaide is conditioned by the passing of the school leaving examination of the Public Examination Board. Passes in English, Latin, Greek or French or German and parts one and two in mathematics are required. The subjects of the first year are physics, inorganic chemistry, physical chemistry, botany and zoology. The first examination at the end of the first year includes all these subjects. In the second year the student enters the dissecting room and studies anatomy and histology. He also engages in the study of physiology, bio-chemistry and organic chemistry. He attends lectures while he is carrying out practical work. The same subjects are continued in the third year and to them are added *materia medica*, pharmacy and pharmacology. At the end of the third year the second examination is held. The student must satisfy the examiners that he has acquired a reasonable amount of knowledge in anatomy, physiology, biochemistry, organic chemistry, pharmacology and *materia medica*.

After the second examination has been passed, the student begins his clinical work. He attends lectures on the principles and practice of medicine and on the principles and practice of surgery, on clinical medicine and clinical surgery, on therapeutics, on preventive medicine and hygiene, on pathology and on bacteriology. He receives practical instruction in the wards and out-patients' department at the Adelaide Hospital and at the University on the subjects enumerated above and on medical zoology. He also has to attend a course in dentistry. In the fourth year he also is present at forty *post mortem* examinations and is required to examine pathological material from patients in the wards. In the fifth year he again attends lectures on the principles and practice of medicine and of surgery, and demonstrations in regional and surgical anatomy. He attends lectures on obstetrics and gynæcology and attends women in their confinements. His clinical work continues throughout the year. In the pathological department he has to attend at forty *post mortem* examinations and to carry out certain practical work. He attends twelve times at the venereal diseases clinic and twelve times at the wards for patients suffering from infectious diseases. At the end of the fifth year, provided that he has completed all the work prescribed, he presents himself for the third examination. The subjects are clinical medicine and surgery, regional and surgical anatomy, operative surgery, therapeutics, pathology and bacteriology, preventive medicine and hygiene and medical zoology. The sixth year is spent in completing his general medical studies and in gaining an acquaintance of some of the special subjects. He works in the wards and out-patients' departments. He studies pædiatrics, ophthalmology, oto-rhino-laryngology, obstetrics, the administration of anæsthetics and medical ethics. He works in the gynæcological wards and also at the Adelaide Hospital for Children. Lectures on psychiatry, on forensic medicine and on clinical medicine and surgery have also to be attended. At the end of the year he sits for his final examinations. The subjects include medicine and diseases of children, surgery, obstetrics, gynæcology, forensic medicine, psychological medicine, diseases of the eye, nose, throat and ear.

The fees including attendance at the Adelaide Hospital and including the fees for examination amount to approximately £220.

The degrees of doctor of medicine and of master of surgery are open to graduates of at least three years' standing. The period may be shortened to two years for graduates who have taken honours at the final examination and for those who have held certain positions. A thesis must be submitted and if this is deemed to be of sufficient merit, the degree may be granted without further examination. Otherwise the candidate must present himself for examination in general medicine and in one of a prescribed set of subjects. The fee for the examination is fifteen guineas and for the degree ten guineas.

PRIZES AND SCHOLARSHIPS.

THERE are very many fellowships, scholarships, prizes and bursaries open to medical students at the three medical schools in Australia. The majority of these appointments has been established in order to encourage intelligent students with aptitude to excel in a particular branch of medicine, while some of the bursaries and scholarships have the object of enabling a young man or woman with larger mental than financial endowment to enter the profession. The bursaries and scholarships available in New South Wales, Victoria and South Australia are obtainable at the secondary schools. Within the universities there are many exhibitions, scholarships and prizes. Their monetary value varies from £5 a year to £100. At the University of Sydney there are the Struth Exhibition and the Henry Wait Bursary, the Renwick Scholarship, the John Harris Scholarship and the Caird Scholarship, the Walter and Eliza Hall Travelling Medical Fellowship, the Anderson Stuart Memorial Research Fellowship, the Norton Manning Prize, the Parkinson Memorial Prize, the S. B. Clipsham Memorial Prize, the Ethel Talbot Memorial Prize, the Hinder Memorial Prize, the Dagmar Berne Prize, the Craig Prize, the Peter Bancroft Prize, the Haswell Prize, the Sandes Prize, the Mills Prize, the Myrtle Sperrey Wardlaw Prize and the Windeyer Prize.

At the University of Melbourne there are the Beaney Scholarship, the Stewart Scholarship, the

Fulton Scholarship, the Jamieson Prize, the John Baird Bursary, the Keith Levi Memorial Exhibition and the David Syme Research Prize, the Alwyn Stewart Memorial Scholarship, the William George Sharp Bursary and the Grice Cancer Scholarship. There are in addition a few lectureships and tutorships endowed by bequests.

At the University of Adelaide the chief scholarships are the Dr. David Murray Scholarship, the Elder Prize, the Dr. Charles Gosse Medal, the Everard Scholarship, the Lister Prize, the Davies-Thomas Scholarship and the John L. Young Scholarship for Research.

Membership of the British Medical Association.

ON August 31, 1927, the British Medical Association had 33,272 members, including 8,239 members outside the British Isles. According to the latest annual reports of the six Branches of the British Medical Association in Australia, the number of members of the Association in Australia is now 4,203. The New South Wales Branch had 1,661 members in March of this year; the Victorian Branch has now 1,368 members, the Queensland Branch has now 460 members; the South Australian Branch had 411 members in June of this year; the Western Australian Branch had 227 members according to the last list; the Tasmanian Branch had 76 members according to the last list. It will be noted that, notwithstanding the fact that there is much more overcrowding in the medical profession in England and Scotland, the relative number of members in Australia is considerably higher than in the old country. It may be said without exaggeration that no medical practitioner who is eligible for membership, can afford to stand outside this great organization.

Apart from the well known privileges attaching to membership of the British Medical Association throughout the Empire, there are certain special advantages to be gained from joining this society in Australia. Each Branch carries out a protective policy for its members, more particularly in regard to friendly society practice, workers' compensation services and similar activities. Each member receives his copy of *The British Medical Journal* which enjoys the highest reputation among medical journals. While few of the members in Australia can attend the annual meetings of the British Medical Association, every one is entitled to attend the triennial Australasian Medical Congress (British Medical Association). The Branches hold very many scientific and clinical meetings during the year and each one has sections formed for the purpose of discussion of the problems of special branches of medical science. Each member in Australia receives in addition to *The British Medical Journal* a copy of THE MEDICAL JOURNAL OF AUSTRALIA each week. In it will be found the records of the meetings of the Branches and of the Federal Committee of the British Medical Association in Australia. It is a channel of communication of the Branch Councils to their members and it also conveys a great deal of information concerning post-graduate study and other matters of interest to Australian practitioners. The Branches in Australia have the power to become corporate bodies, registered under the appropriate *Companies Acts* and those that have taken advantage of this permission, enjoy the power to carry out all the functions that the British Medical Association can carry out. The exceptional activity of the Branches and their almost complete autonomy render membership particularly valuable.

Any medical practitioner registered in a State of Australia is eligible for membership of the British Medical Association. Election is effected after nomination by two members. The New South Wales Branch is prepared to elect senior medical students as honorary associates. They can attend meetings, but cannot speak or vote. On graduation they cease to be honorary associates. No other Branch has extended this valuable privilege to medical students. THE MEDICAL JOURNAL OF AUSTRALIA is offered to honorary associates of any Branch at a nominal subscription of twelve shillings and sixpence a year.

The subscription to the New South Wales Branch is five guineas a year. Members within three years of graduation and those who have retired from practice or who have reached the age of seventy-five years, can retain their membership for three guineas. Permanent whole-time medical officers of the public services are required to pay four guineas. The subscription to the Victorian Branch is four pounds fourteen shillings and sixpence for town members and four pounds for country members. Medical officers on the permanent lists of the Defence Department may pay three guineas. Members engaged in medical institutions or in medical research on a whole-time basis or who are occupying whole-time positions in the Government medical services, but are not engaged in the practice of their profession, may apply for a reduction of subscription. Each application is considered on its merits. Junior members pay two pounds twelve shillings and sixpence.

The subscription to the Queensland Branch for members residing in the metropolitan area is five pounds; the members residing in the country pay four pounds. Junior members pay two pounds ten shillings.

The South Australian Branch charges its members four pounds five shillings. Country members are required to pay three pounds fifteen shillings. Graduates of the University of Adelaide of not more than three years' standing are charged three guineas.

The Perth and Fremantle members of the Western Australian Branch pay four guineas a year, while the country members pay three guineas. Junior medical officers of public hospitals pay two guineas.

The subscription to the Tasmanian Branch is four guineas for all members.

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SATURDAY, DECEMBER 8, 1928.

Research.

MEDICAL education divorced from original observation leads the student into a stagnant position, a position in which the previous generation of medical practitioners stood. It is a regrettable experience that the dogmas imparted to medical students belong to stereotyped data that have been accepted for inclusion into text books. The student is required to reply to examination questions in the stereotype manner. In other words students are usually not encouraged to observe for themselves and to draw deductions from their observation. They are expected to repeat what their teachers have told them, often in the same words. Education based on this practice is unlikely to stimulate the spirit of inquiry in the individual and tends to perpetuate a class of medical practitioners who are indifferent to the advances in medical science and whose horizon does not extend beyond the application of remedies in the vain hope of curing a disease from time to time. The ideal objective of medical education is to produce a medical practitioner whose knowledge of human beings in health and disease enables him to perform valuable services both to the individual and to the community. Unless the medical practitioner exercises a critical judgement in regard to the teachings of the day and of the past, he will not further the progress of medical knowledge. It may therefore be accepted as the first thesis that the spirit of inquiry and the habit of challenge should be developed in the student early in his training.

The term research connotes observation, experiment and inquiry. No one who has not been trained to use his eyes, ears, sense of smell, sense of touch, sense of taste, can hope to investigate a difficult problem with a reasonable prospect of success. The true investigator must possess the power of reasoning. He must be competent to assemble facts and to weigh evidence. He must be ingenious enough to perceive where the chain of evidence is defective and to devise means whereby these defects can be remedied. He must be schooled to start an inquiry on a single observed phenomenon and gather information step by step from that beginning. He must be able to resist the temptation of conceiving a hypothesis and seeking evidence to prove it. Instead he must be content to vary conditions of an observed fact and to ascertain the effects of the modifications of external or internal, natural or artificial changes. He must be patient in applying trial, for he will certainly fail to produce a definite and regular reply to his experiment many times before he will call forth a significant response. Lastly, he must be educated to use words in their clear and logical meaning, so that he may not be misled by slovenly language into slovenly thought.

The true research student must be imbued with a craving for inquiry. He must always be questioning, doubting, searching for truth. He must be an unbeliever, taking nothing for granted, refusing authority, unless it is supported by irrefutable proof.

There are many other attributes that are essential. If a man is determined to make a large income at all costs, he has no place in the world of research. It is, perhaps, not too much to say that since medicine is a scientific profession, its members should be scientists, placing their science before all else. The commercial conception of life is incompatible with the scientific. The medical profession should never be converted into a trade, an instrument for selling goods at a high price.

Associated with the spirit of altruism there is necessary in the investigator readiness to sacrifice comfort and even safety for work. At times the investigator must forget his meals and even his night's rest. He must not allow a risk to interfere with the prosecution of his inquiry and he must follow it through all difficulties until he can make a pause without detriment to his work. He must work quietly, in obscurity, without publicity and without caring for fame. The limelight seeker is usually a charlatan who fails scientifically and is ultimately found out.

It may seem that there is little inducement for a human being to take up research work seriously

as a calling. No greater mistake could be made than to take this view. Once the spirit of inquiry has been awakened, research work exerts so powerful a fascination over the individual that he refuses to relinquish it for the most brilliant prospects of reward or fame. The work is worth while for its own sake. Every medical student should be taught to engage in some original investigation and to become a seeker after truth. Every medical practitioner should make it his highest aim in life to contribute something to the sum of medical knowledge. Moreover, every scrap of information should be valued for its own sake. The real scientist works at a problem which has no apparent practical application, for to him it is knowledge that matters. Who can say whether a fact wrung with immense labour and persistence from Nature will or will not be of practical value if applied at a later date to a particular problem? The craving for knowledge should be encouraged in every disciple of Æsculapius.

THE BRITISH MEDICAL ASSOCIATION.

THE medical profession is one of the liberal professions. Its members are regarded as educated gentlefolk. They are charged with the duty of taking care of the health of men, women and children and of applying the knowledge that has been gained concerning health and disease to the very best of their ability. They are called to the bedside of persons who are ill, and the relatives impose in them an unbounded trust. They penetrate into the most intimate recesses of the lives of men and women and their advice is followed implicitly. The nature of their calling places them in a peculiar position. All this renders it essential that the members of this honourable profession should be governed by rules of conduct far stricter and far more exacting than those that apply to other people. A special ethical code is needed because of the peculiar relations that exist between the doctor and his patient. Commercial competition could not be tolerated between medical practitioners. The selection of a doctor by a patient must be spontaneous, dictated solely by the trust the latter can impose on the individual of his choice and his belief in the individual's knowledge and skill. Patients do not bargain with their doctors, but rely on their integrity. The poor man has a right to expect the same attention and the same exercise of care and application of skill as has the rich man. The doctor is prepared to devote a substantial part of his life to the gratuitous attendance of the sick poor. While the rules of conduct for medical practitioners differ from those of the general community, the medical practitioner is often at a grave disadvantage because these rules prevent him from looking after his own interests.

The circumstances surrounding the lives of medical practitioners have rendered it necessary for some powerful organization to define the code of ethics and rules of conduct of practitioners and to undertake such negotiations with governmental departments, public bodies and other institutions as are necessary in the public interest and in the interests of the medical professsion. The British Medical Association was founded in the year 1832 to promote the medical and allied sciences and to maintain the honour and interests of the medical profession. In the course of ninety-six years it has established itself firmly in the opinions of the community and is today consulted by governments and by public authorities in connexion with all matters affecting the public health. The rules of the British Medical Association are strict and each member is required to subscribe to them. A comprehensive code of ethics has gradually been evolved, so that at the present time the proper behaviour of its members towards other members of the medical profession and towards the public under the most varying conditions is defined. The British Medical Association acts collectively for its members in matters of medico-political significance and takes all the necessary steps to insure that when members of the medical profession are engaged to undertake work for public bodies or for friendly societies, the conditions governing their appointment are reasonable and equitable. The British Medical Association determines the extent of concessions that may be expected of medical practitioners. It also advises its members in regard to public services. Under certain conditions the members of the medical profession may be required to act for the welfare of the

public and for the safety of the nation. The British Medical Association is competent to formulate the conditions of such services. Apart from its ethical, medico-political and social activities, the British Medical Association is concerned with the accumulation of scientific knowledge and with its dissemination.

No medical practitioner can afford to stand aloof from this beneficent and powerful organization. The government of the Branches in Australia is based on the constitution of the British Medical Association and sane counsels prevail. The individual members have ample opportunity of expressing their views and those who take an active interest in the welfare of the profession, are usually given seats on the Councils of their Branches. The policy of the Branches is determined by the vote of members at general meetings and the views of the majority are necessarily adopted. Every member enjoys the protection of the organization, is guided in respect of correct behaviour and derives benefit from the fact that all bargaining with friendly societies and similar organizations is conducted collectively for him by his Branch. The British Medical Association enables its members to practise their profession to their own advantage and to the advantage of their patients, in friendly relationship with their colleagues and in harmony with the world. We urge every student to make up his mind that he will join the British Medical Association as soon as his name is entered upon the medical register.

The Public Services.

THE PUBLIC HEALTH SERVICES.

Two years ago a full account was given in the Education Number of THE MEDICAL JOURNAL OF AUSTRALIA of the seven public health services in Australia. In the interval relatively small changes have been effected, although it is anticipated that within a short time some important modifications and extensions will be introduced. The reader is therefore referred for the details of the services to the articles that appeared in 1926.

COMMONWEALTH OF AUSTRALIA.

The Department of Health of the Commonwealth was created in March, 1921. For seven and a half years the Department had its headquarters in Spring Street, Melbourne. The offices have now been transferred to Canberra, the Capital Territory. The Department is divided into several divisions. It is in effect the continuation of the Quarantine Department that existed from 1901 to 1921. Its present functions include the administration of the *Quarantine Act,* the investigation into the causes of disease and death, the education of the public in matters connected with the public health, the prevention of disease, the assistance of the State governments or public authorities in an endeavour to combat or prevent outbreaks of disease, the conducting of campaigns of prevention of disease in which more than one State is concerned. The scope of the Department has been enlarged to some extent by the adoption of the recommendations of the Royal Commission on Health. Reference is made on another page of this issue to the school which is being created at the University of Sydney for the study of tropical medicine and hygiene. The work of controlling ships that arrive at Australian ports is now undertaken by the Division of Marine Hygiene. The Chief Quarantine Officer in each State has a complete staff, while at the minor ports there are part-time quarantine officers. The second division is the Laboratories Division. Information concerning this institution will be found in the article on the facilities for research. The next is the Industrial Hygiene Division. The head of the organization is the Divisional Director who has a small staff working under him. In the Division of Tropical Hygiene there is the Director of the Division, the Director of the Australian Institute of Tropical Medicine, Townsville, three quarantine officers, four laboratory medical officers and some medical officers at the Townsville institute. In addition there are the medical officers attached to the Hookworm Campaign. The Division of Public Health Engineering is under the control of the Director who has a staff of trained assistants. Divisions of Epidemiology, of Tuberculosis and Venereal Diseases and of Maternal and Infant Welfare have also been established. The salaries offered to the medical officers in the Department of Health commence at £708 and increase with service and promotion. The Divisional Directors receive from £1,200 to £1,400 a year. The Department employs a large number of medical officers and the prospects of success are admirable.

NEW SOUTH WALES.

The public health service in New South Wales is controlled by the Board of Health. The President of the Board of Health is also the Director-General of Public Health. Under him there are the Senior Medical Officer, the Director of Maternal and Baby Welfare, two assistant medical officers, the Government Medical Officer and Police Surgeon, the second Government Medical Officer, the Principal Microbiologist, three assistant microbiologists, the Medical Officer of Industrial Hygiene with two assistants, the Director of Tuberculosis, the Medical Officer of Health of the Metropolitan District, the Medical Officer of Health of the Hunter River District, the Medical Superintendent of the Coast Hospital, a deputy medical superintendent and nine

assistant medical officers, the Medical Superintendent of the Waterfall Sanatorium and an assistant medical officer, the Medical Superintendent of the Lidcombe State Hospital, the Medical Superintendent of the Liverpool State Hospital, the medical officers at the institutions at Newington and elsewhere. In all there are thirty-three full-time salaried medical officers. Their salaries vary from £500 to £1,500 a year. In each town of importance there is a government medical officer who receives fees for services, but no salary. Since the introduction of the *Workers' Compensation Act* in 1926, a chief medical referee and one medical assistant have been appointed. The Director-General of Public Health has certain powers in connexion with the majority of the hospitals in the State and he has control over the Government Analyst's branch. Each branch of the Department is well organized and the medical officers have ample opportunity for the exercise of professional and administrative ability and skill.

VICTORIA.

Up to the present the public health service of Victoria is controlled by a Commission of Public Health comprised of the Chief Health Officer and six other members appointed by the Governor-in-Council. The State is divided into seven health areas, two of which are within the boundaries of the municipality of Melbourne. Each health area is administered by a district health officer. The Department has the Chief Health Officer and four district health officers. The Medical Officer of Health of Melbourne is an officer appointed by the Municipal Council of Melbourne. He is a whole-time officer. All the other medical officers of health appointed by municipal councils are part-time officers. They are paid from £10 to £300 according to the amount of work required to be done. The permanent officers of the Department, including the Venereal Diseases Officer and the Infectious Diseases and Industrial Hygiene Officer, receive salaries ranging from £700 to £850. The Chief Health Officer's salary ranges from £1,000 to £1,100 a year. In addition there are part-time Tuberculosis and Infant Welfare Medical Officers. The former has the right of private practice and receives £1,000 a year and the latter is paid £450 a year.

Recently a bill has been introduced into the Victorian Parliament reconstituting the Department of Public Health. This measure provides for one permanent head who is not necessarily a medical practitioner. Under him would be the chiefs of the general health branch, of the mental hygiene branch and of the sanitary engineering branch. Grave objection has been taken to the proposal to subordinate the chief medical officers of the Public Health and of the Lunacy Departments to a layman. It is not proposed to create a portfolio of health, as has been done in other States. Indications are present in view of the change of government that the bill may be dropped. Under the existing conditions the law is immensely complicated and the administration of the numerous acts dealing with health and hygiene is unnecessarily difficult. It is probable that an endeavour will soon be made to simplify the machinery and to improve the administrative control by leaving more to the discretion of the Chief Health Officer and relieving the legislative measures of much of the mandatory details.

QUEENSLAND.

The administration of the *Health Act*, 1900, of Queensland, is entrusted to the Commissioner of Public Health who is responsible to the Home Secretary. Under the Commissioner are the Deputy Commissioner and Health Officer, an acting director of bacteriology, a part-time tuberculosis medical officer and four part-time medical officers for venereal diseases. The Commissioner of Public Health has complete control over his department. He receives a salary of £950 a year. The Health Officer acts in the place of the Commissioner during his absence. He has the duty of investigating outbreaks of infective disease. He is required to visit the Leper Lazaret at Peel Island and has various routine services to carry out. He is paid £850 a year. The laboratory work is at present conducted by an acting director. He undertakes all the usual diagnostic work and also the ordinary public health investigations. He receives a salary of £800 a year. The medical officer in charge of the Central Tuberculosis Bureau is required to decide whether patients referred to the clinic are to be sent to a sanatorium or to the hospital for patients suffering from chronic diseases. He gives part-time service and is paid £200 a year. The venereal diseases clinics are administered by the Department. There is a lock hospital for prostitutes. Branch offices are situated at Cairns, Cloncurry, Mackay, Townsville, Rockhampton, Charleville and Toowoomba. The part-time medical officers receive a salary of £150.

A few months ago the City Council of Brisbane resolved to discontinue the office of City Health Officer. It will be remembered that in 1926 twenty local authorities agreed to become merged into a single council in order to create a municipal area of Greater Brisbane. One of the first acts of this combined authority was to establish a department of health and appoint a medical officer of health. Dr. H. W. Tilling was appointed. It appears that the former arrangement of neglect of health control has powerful advocates in the Council of Greater Brisbane. The medical profession has protested most emphatically against this retrograde step. Unfortunately Dr. Tilling had been forced to retire when his office was abolished. It is greatly to be hoped that the Council will soon realize that it has made a serious mistake and will reestablish the department and appoint a competent medical officer to look after the health conditions of Brisbane.

SOUTH AUSTRALIA.

The control of the public health in South Australia is founded on the plan of holding the local authorities responsible for the application of measures necessary to safeguard the health of the people. The general administration is centralized

in a Central Board of Health. The Board comprises the Chairman who is the chief medical officer of the State, and four non-medical members. The Chairman of the Board of Health has no medical colleagues in his department. The Central Board of Health assumes administrative control of areas with scanty population. The legislative basis of the health administration is not a modern measure. Under the present system there is no opening for medical practitioners who are interested in preventive medicine and hygienic work in South Australia.

WESTERN AUSTRALIA.

In Western Australia the control of the public health is vested in a Commissioner of Public Health who has a well organized office and an efficient small staff. According to the *Health Act* of 1911 he is directly responsible for the administration of the measure. His duties include the control of infective diseases, the control of State hospitals and sanatoria, the application of hygienic measures deemed to be necessary. He is further responsible for the administration of the clauses of the act dealing with the control of venereal diseases. This measure has been fully discussed in these columns on numerous occasions. The staff consists of the Medical Officer of Health and Assistant Inspector of Hospitals, the Bacteriologist and the medical officers of the school medical service. Dr. Everitt Atkinson explained in detail in 1926 the plan on which the *Health Act* is administered by his department. The Bacteriologist is required to carry out the examination of specimens submitted from all hospitals other than the Perth Hospital. The range of salaries in the service is from £636 to £1,200 a year.

TASMANIA.

Reference was made last year to the fact that the position of Director of Public Health in Tasmania is vacant. The opening for young graduates at the present time is therefore not favourable. It appears that the *Public Health Act*, the *Venereal Diseases Act*, the *Food and Drugs Act*, the *Places of Public Entertainment Act* and the *Hospitals Act* are administered by the officers of the Department of Public Health. The only medical officer employed at present is the Assistant Health Officer. The Government of Tasmania has not been fortunate in its dealings with the medical profession for many years and appears to be unable to take a broad-minded view of medical affairs. Energetic action is needed to place the hygienic affairs of Tasmania on a sound footing.

School Medical Services.

WITH the increasing recognition of the importance of preventive medicine more attention has latterly been paid to the regular examination of school children. Ante-natal and post-natal care have been the means of saving many lives to the nation and the constant oversight of school children is found to be the means of eliminating disease, of correcting abnormalities and of placing children who have not a mental equipment equal to that of their fellows, in surroundings suited to their condition. That children of the preschool age are not yet supervised is unfortunate. This is the last link which has to be forged in the health supervision of the individual.

This aspect of the problem could be solved if the suggestion of Dr. L. St. Vincent Welch, the Chief Medical Officer of the Department of Public Instruction of Queensland, were adopted. In speaking of the question of dental infection and treatment of children, he advocated the establishment of nursery schools and *Kindergarten* at which attendance should be compulsory, and where early training should take place before enrolment at any school. With the establisment of institutions such as these a great number of the children of preschool age could be supervised.

The importance of the work of a medical inspector of children cannot be overestimated. The medical practitioner who undertakes this work, should be actuated by ideals of prevention and by a desire to accomplish something for the good of the community. He should be interested in "the whining school boy, with his satchel and shining morning face, creeping like a snail unwillingly to school." He is hardly likely to be successful if he undertakes the work merely on account of its regular hours, its freedom from night work, the regular salary attached to it, the annual holidays and the superannuation. These are, however, important advantages and will rightly appeal to the medical graduate who is temperamentally unfitted for general practice. Such an individual should give careful consideration to the career of a school medical officer. He will find the work full of opportunity for training his powers of observation, for studying the psychology of childhood, for diagnosis and for cooperation with his *confrères* who are in general practice.

NEW SOUTH WALES.

The School Medical Service of the Department of Education of New South Wales was reorganized in the year 1913. Since that time an endeavour has been made to visit every school at least once in every three years and to make a complete examination of every child at each visit. In the metropolitan and rural districts attention is paid to the dental defects of the child and a travelling ophthalmic surgeon is employed in the outlying country districts.

At the present time the staff consists of the Principal Medical Officer, eight metropolitan and ten country medical officers including two ophthalmic surgeons.

There are eleven travelling dental clinics; these consist of a dental surgeon and his assistant and deal with children in the country. In the metropolitan area eight part-time dental surgeons are employed. The duties of a school medical officer

consist of the medical examination of school children for the discovery of any defects which are interfering with the educational progress or which are hindering the physical development of the child. In addition sanitary inspections are made and addresses on hygiene are given to parents. Opportunity is given to the staff to gather information in regard to the frequency of certain diseases and to investigate the degree of backwardness and mental deficiency of school children. In the past useful information has been obtained in regard to the prevalence of acute rheumatism and goître. During his routine work a school medical officer as a rule examines about forty children in a day and records the findings. This work is carried out in school time and represents about 216 days' work a year. Each medical officer thus examines about 7,000 children in the year and some estimate may thus be formed of the amount of work of this kind which is carried out annually by the Department.

Of special importance is the work which is being carried out at the Glenfield Special School. A visit was made to this school during this year by the members of the New South Wales Branch of the British Medical Association. Here the results of the routine medical examination may be seen by those interested in the subject and it will be found that many children who would otherwise be neglected, are being trained to become in some measure self reliant.

A medical officer from the department takes an important part in the work at the Teachers' College; lectures are given on hygiene which is an essential subject in the training of teachers. Another medical officer investigates delinquent children at the Children's Court.

By arranging special duties to correspond with increased experience of the officer it has been possible to arrange a better scale of salaries permitting of more satisfactory promotion. The entrant position at present carries a salary for men of £528, rising to £630 *per annum* and for women of £450, rising to £550. When the medical officer is employed in rural work, a travelling allowance of £180 *per annum* is made and all actual official travelling by rail, coach and tram is of course met. Of the senior officers men receive £700 to £750 and women receive £600 *per annum*. Of the specialist officers men receive £750 to £850 and women receive £640 *per annum*. It is expected that candidates for admission to the Department should have at least a year's post-graduate hospital experience and it is desirable that such should be as a resident.

VICTORIA.

At the present time the staff of medical officers engaged in the medical inspection of school children in Victoria consists of a central group of four full-time officers (two men and two women) and a country group of four full-time officers (one man and three women). Additional assistance is given by four district health officers who are attached to the Public Health Department and who do part-time school work. There is also an additional staff which is divided into metropolitan and country sections. In such important towns as Bendigo, Ballarat and Geelong a dental surgeon remains for four months of the year. Two school nurses are employed to "follow up" children in the metropolitan area requiring treatment. Each elementary school is visited every three years and each child is examined. High schools are revisited every two years.

In addition to the medical examination of school children the medical officers are responsible for the examination of (i) all teachers entering the public service, (ii) all teachers applying for superannuation, (iii) all teachers on sick leave for one month or more. Lectures on hygiene are also given by the central staff to University students taking the diploma of education course and to science students graduating in physiology and hygiene, as well as to teachers at the Teachers' College, Domestic Economy College and summer schools.

The salaries of four medical officers, two dental surgeons, three dental attendants and two school nurses amount to approximately £5,000.

QUEENSLAND.

The School Medical Service of Queensland has been reorganized since the appointment of the present Chief Medical Officer. The present staff consists of the Chief Medical Officer, one whole-time departmental medical officer, an ophthalmic surgeon, eleven part-time medical inspectors, thirty-two "blight practitioners," eleven dentists and five nursing sisters.

A great deal of progress has been made with the dental side of medical inspection. A full account of the nature of the work which is carried out by this department, was published in this journal on October 13, 1928. There is a staff of ten dental surgeons who work under a Chief Dental Inspector. The work which has been carried out by this department is of the highest order.

The Chief Medical Officer is advisor to the Minister for Public Instruction in regard to all matters pertaining to school health. When questions of policy in the control of health arise, the Chief Medical Officer confers with the Health Commissioner. The medical officers of the department undertake the examination of all candidates for entrance to the Teachers' Training College. Part-time medical inspectors receive a salary of £100 *per annum* with the exception of two who receive £50 *per annum*. The thirty-two medical practitioners who treat children with blight in the western parts of the State, receive remuneration at the rate of £50 *per annum*. It is the aim of the present Chief Medical Officer to extend the activities of his department and it is hoped that his recommendations for the appointment of additional full-time departmental officers will be carried into effect.

SOUTH AUSTRALIA.

The work of medical inspection in schools in South Australia has reached a high standard of

efficiency. The present Principal Medical Officer was for many years handicapped by a small staff, but since her recommendations in this regard were accepted, she has been able to deal adequately with the problems presented.

The present staff consists of the Principal Medical Officer, five medical officers (one man and four women), three dentists, four school nurses, three dental assistants (two of whom are trained nurses) and a disinfecting officer with the necessary clerical staff. A psychologist is also attached to the staff and works in close association with its members. The Principal Medical Officer receives from £600 to £700 *per annum* and the medical officers receive from £450 to £650 *per annum*.

The work of the Principal Medical Officer is largely administrative. She is charged with the compilation of the various reports, she gives lectures on school hygiene and is responsible for the examination of women who enter the Teachers' College, and for the examination of teachers in the subject of school hygiene. The school medical officers have charge of a country district, but their work has been so arranged that they are able to spend a certain amount of time in the metropolitan area and by this means they are able to keep in close touch with the headquarters and with one another.

The work of the psychologist is interwoven with that of the school medical officers. All mentally defective children are examined by her and after consultation advice is given as to future training.

All civil servants in South Australia have recently been compelled to join the Government superannuation scheme. They are allowed to take up to eight units and this provides a pension of £208 a year. The compulsory retiring age of women is sixty-five and of men seventy-five, but the former may retire at sixty and the latter at sixty-five years of age. The fund also provides for similar benefits if the civil servant is permanently incapacitated by illness.

Western Australia.

The body which controls medical inspection in schools in Western Australia, is the Public Health Department and not the Education Department as in most of the other States. The work of inspection has been severely handicapped owing to insufficient staff. There are more than 64,000 children in the State and to cope with this number there are a Senior Medical Officer who does part-time duty only, and two full-time medical officers who are women. Of the latter one devotes her time to the metropolitan schools and the other confines her activities to schools in the country. It is obvious that such staff is quite inadequate for such a huge tract of country as Western Australia. Although dental inspection and treatment has been carried out for some years, it has been felt that much more could be accomplished if additional appointments to the dental staff were made. The new Dental Hospital in Perth has been found to offer useful facilities for the treatment of dental defects in children. Three full-time nurses are employed by the Department and they assist the medical officers in the work of examining school children and in addition they make frequent examinations for pediculosis.

Tasmania.

There are two full-time officers working in the Department of Education in Tasmania. One carries out medical inspection of schools in the southern and eastern districts and the activities of the other are confined to the northern and western portions of the State. Four nurses assist the medical officers in their work. The remuneration of the medical officers starts at £375 *per annum* and rises to £475 *per annum* by annual increments of £25. Useful assistance is given to the medical officers in the education of mentally defective children by the State psychology clinic. These children are cared for in special classes, but there is as yet no residential school at which these children may receive continuous training. The department includes on its staff four dentists, two of whom work in the cities and two spend their time in the country.

The Mental Hospital Service.

New South Wales.

In New South Wales there are ten mental hospitals, three licensed houses, four reception houses, one psychiatric clinic for voluntary patients and there is also a pathological department. The number of beds available in the ten hospitals and the psychiatric clinic is 7,325. These are not sufficient for the needs of the community, for the number of patients always exceeds the number of available beds. During recent years out-patient clinics have been established at various general hospitals; these include the Sydney Hospital, the Royal Prince Alfred Hospital, the Royal North Shore Hospital, the Parramatta District Hospital, the Newcastle General Hospital and the Goulburn and Orange District Hospitals. The advantages of these clinics is being more and more appreciated by the general public and advice is sought voluntarily by persons in the early stages of mental disease. It should also be pointed out that voluntary patients are admitted to all the mental hospitals in the State. Advantage is being taken of his arrangement in increasing measure.

The head of the service is the Inspector-General of Mental Hospitals. He has complete control over all the institutions devoted to the care and treatment of persons with mental disease and over all those engaged in them. His office is in Sydney and he is paid a salary of £1,400 a year. In the larger mental hospitals, such as Callan Park, Gladesville, Parramatta and Kenmore there is a medical superintendent of the first class who receives a salary starting at £971 4s. 4d., rising to £1,071 4s. 4d., with a deduction of £124 for quarters, light, laundry and part furniture. At these institutions there are in addition a deputy medical superintendent and a staff of medical officers. The smaller institutions are in the care of a medical super-

intendent of the second class who has not got the assistance of a deputy. Deputy medical superintendents and superintendents of the second class receive a salary ranging from £847 4s. 4d. to £897 4s. 4d. with a deduction of £100 for furnished quarters, fuel, light and laundry. On entering the service, a medical practitioner is appointed a junior medical officer and as such receives a salary of £463 4s. 4d. with a deduction of £100 for furnished quarters, fuel, light, laundry and service. His appointment is for a period of twelve months. After this period he is either promoted to the position of medical officer or he is required to leave the service. Medical officers receive £547 4s. 4d. *per annum*, rising to £647 4s. 4d. and this remuneration is subject to a deduction of £100 for furnished quarters, fuel, light, laundry and service. Their duties comprise those which are usually carried out by a resident medical officer and in addition they are required to attend the special course in psychiatry at the University of Sydney and to obtain the diploma. Promotion follows in accordance with length of service, but the appointment of a medical officer to the position of senior medical officer and to higher positions depends on the occurrence of vacancies. Senior medical officers receive a salary starting at £697 4s. 4d., rising to £797 4s. 4d., with the same deduction as that of medical officer. Throughout the service importance is attached to research work and all medical officers are expected to undertake investigation in their respective departments. The pathological department is in the care of a director who receives a salary of £897 4s. 4d. At this department all the bacteriological, bio-chemical and pathological work of the mental hospitals is carried out.

After their period of probation medical officers are entitled to contribute to a superannuation fund. The rates of contribution vary with the age of the officer on appointment and the amount of pension depends on the rate of salary. Medical officers are given four days' privilege leave every month and are also allowed one month's annual leave for recreation. After fifteen years' service they are entitled to extended leave of three months and if the extended leave is taken after twenty years, its period is six months. If extended leave is taken later, it is calculated at the rate of six months for twenty years' service.

VICTORIA.

The Lunacy Department of the State of Victoria is administered by an Inspector-General. There are hospitals at Kew, Mont Park, Sunbury, Ararat, Beechworth and Ballarat. At Royal Park there is a mental hospital in connexion with the Receiving House. There is also a receiving house at Ballarat. This is independent of the hospital for the insane, but it is controlled by the medical staff of the main hospital. At Bendigo there is a receiving ward at the District Hospital. There are also four licensed houses and two retreats for inebriates. There are special wards for military patients at Bundoora and at Mont Park. At the Kew Hospital there is a separate institution for mentally deficient children. The number of certified persons in the State of Victoria is in the neighbourhood of 6,000. Voluntary patients may be received into any mental hospital or receiving house.

The Inspector-General of the Insane who has complete control of the department, receives a salary of £1,500 *per annum*. There is a medical superintendent in charge of each of the mental hospitals. These officers receive a salary starting at £775 *per annum*, rising by steady increments to £925 with a deduction of £100 for rent, fuel, light, water, milk, vegetables and laundry service. There are six senior medical officers in the service and they rank under the medical superintendent. They are placed according to the Public Service Regulations in Class B. Their salary starts at £650 and rises to £702 with deductions of £72 for rent, fuel, light, water, milk, vegetables and laundry service. The junior medical officers number eight. The initial salary of a junior medical officer is £533. They receive partly furnished quarters, fuel, light, water, milk, vegetables and laundry service, for which a deduction of £60 is made. In certain cases they receive rations, for which an annual deduction of £14 is made. The maximum salary for junior medical officers is £598 *per annum*.

The pathologist is a whole time medical officer; he has the same status and emoluments as a medical superintendent. He has charge of the laboratories at Kew, Royal Park and Mont Park and receives a travelling allowance. All the medical officers in the department are entitled to come under the provisions of the *Superannuation Act* and they pay the statutory deductions for this purpose.

There are two clinical assistantships at Royal Park which are half time positions and are filled by qualified medical practitioners. They receive £200 *per annum* for the first six months of their engagement and £250 if appointed for a second period.

The medical superintendents at Royal Park and Kew and the pathologist are required to give lectures on mental diseases to the medical students of the University of Melbourne.

There is no provision for extended or long service leave in the department and the annual holiday leave amounts to three weeks.

QUEENSLAND.

The hospitals for the insane in Queensland are three in number and there is one reception house. The largest hospital is at Goodna and the other two are at Toowoomba and Ipswich. There is accommodation in these three hospitals for 3,037 patients. The reception house is at Townsville. There is a ward at the Brisbane General Hospital for patients with mental disease. The service which is under the control of the Home Secretary's Department, is administered by the Inspector of Hospitals for the Insane, who also acts as Medical Superintendent of the hospital at Goodna. He receives a salary ranging from £850 to £1,000 *per annum*. There is

at Goodna a senior medical superintendent whose salary ranges from £575 to £750 a year; a second medical superintendent receives a salary ranging from £500 to £650 a year. A third medical superintendent is paid a salary of £360 a year and is allowed to carry on private practice in the surrounding district. At Toowoomba, at the Willowburn Mental Hospital, there are a medical superintendent and an assistant medical superintendent. The former receives a salary rising from £650 to £850 and the latter a salary ranging from £500 to £650. At the Ipswich Mental Hospital there is only one medical officer, the medical superintendent whose salary ranges from £600 to £800. All medical officers are provided with an unfurnished house, fuel, light, milk, garden produce and laundry service. Each is entitled to six weeks' holiday leave every year and they may contribute to a superannuation fund set up under the conditions prescribed by the *Public Service Act* 1922. According to the provisions of this act subscribers are entitled to £100 during incapacity and to an annuity of £200 on retirement at a prescribed age. In the event of death a sum of £800 is paid to the next of kin. The incapacity alllowance is payable after the officer has exhausted all the sick leave with pay and half pay for which his service makes him eligible.

The reception house at Townsville, previously mentioned, is under the charge of a nurse and is visited by a medical practitioner who is a part time officer of the service.

South Australia.

The accommodation in South Australia for persons suffering from mental diseases comprises the Parkside Mental Hospital and the Enfield Receiving House. The control of these institutions is in the hands of a board of three persons of whom the Inspector-General of Hospitals is chairman. According to the *Mental Defectives' Act* 1913, the Inspector-General of Hospitals is responsible for the general conduct of the Mental Hospital and for the manner in which the patients are treated. The Parkside Mental Hospital is under the supervision of the Superintendent who receives £975 a year with house, rations, fuel, light and laundry service. The Superintendent is also Superintendent of the Hospital for Criminal Mental Defectives. He is entitled to three weeks' recreation leave each year and to sixteen days' sick leave on full pay. He also receives six months' leave on pay for every five years of service. There is a Deputy Superintendent who receives £725 a year with house, rations, fuel, light and laundry service. His duties are those of a senior medical officer and he also acts as Deputy Superintendent to the Hospital for Criminal Mental Defectives. The Junior Medical Officer is paid a salary of £600 *per annum* with apartments, rations, fuel, light and laundry. Both the Deputy Superintendent and the Junior Medical Officer are entitled to the same leave as the Superintendent.

There is an arrangement whereby two resident medical officers are appointed for interchange between the Adelaide General Hospital and the Parkside Mental Hospital for a period of twelve months. Each serves for a period of six months at the two institutions. The salary paid is £100 a year with apartments, rations, fuel and light.

The Enfield Receiving House has a staff of two part time medical officers who attend daily and when required by the matron. The average number of patients in residence is between eighteen and nineteen. The Superintendent receives £360 a year and the Deputy Superintendent £290 a year.

Western Australia.

In Western Australia there is one public hospital for patients with mental disease. There are three smaller institutions for the reception of ex-soldiers and private patients. There is provision at Claremont Hospital for over one thousand patients. The services are under the control of the Inspector-General of the Insane who is also Medical Superintendent of the Claremont Hospital. He is provided with a house and receives a salary starting at £960 and rising to £1,020 a year. The Deputy Medical Superintendent is provided with a house and receives from £528 to £672. The Assistant Medical Officer is provided with board, has certain allowances and receives a salary commencing at £456 and rising to £576. There is also a Pathologist and Bacteriologist who receives a salary ranging from £576 to £708. He also acts as relieving medical officer.

Tasmania.

There is one hospital for the insane in Tasmania, situated at New Norfolk. It is in the care of a medical superintendent who is directly responsible to the Minister controlling the department. He receives a salary of £707 a year with allowances valued at £93. There is an assistant medical officer who is paid £544 with allowances valued at £76. All who join the staff of the Mental Diseases Hospital before the age of thirty-two years, are obliged by the regulations of the service to contribute to the superannuation fund.

Medical Registration.

Since the publication of the Education Number of The Medical Journal of Australia last year there have been no changes in the medical registration acts of the several States of the Commonwealth. It is thus necessary for persons holding degrees or diplomas in medicine to register in each State in which they desire to practise. It was hoped that effect would be given to the recommendation of the Royal Commission on Health that the Commonwealth should secure the transfer to it of the powers held by the States in regard to medical registration. These hopes, however, have not yet been realized. Thus reform cannot be expected in the near future and matters are at a standstill. There is even no medical act as far as the Federal Capital Territory is concerned and those desirous of practising in the area must comply with the provisions of the New South Wales act.

Fees for Registration.

In New South Wales no fee is required to be paid by persons desirous of registering as medical practitioners. In the other States fees are charged and the fees differ in each instance.

In Victoria a fee of five guineas is required to be paid on application for registration. A further fee of five shillings is charged for the registration certificate.

In South Australia an annual registration fee of one guinea is charged. If they prefer to do so, however, medical practitioners may pay the sum of five guineas either at the time of registration or subsequently as a commutation of all registration fees.

The fee for registration in Western Australia is ten guineas.

In Tasmania the registration fee is three guineas.

In Queensland the act provides that an annual registration fee shall be determined in January of each year and that this fee shall be paid by every registered practitioner. On failing to make such payment, the practitioner shall cease to be a registered practitioner.

Qualifications for Registration.

In the succeeding paragraphs the persons entitled to registration are specified.

New South Wales.

(i) Graduates of Australian universities.

(ii) Graduates of universities in the United Kingdom.

(iii) Diplomates of the recognized medical corporate bodies in the United Kingdom entitled to registration in the United Kingdom.

(iv) Persons who are or have been appointed medical officers in His Majesty's sea or land services.

(v) Persons entitled to practise in a foreign country which has entered into reciprocal arrangements with Australia in this regard, provided that they have passed through a course of study of not less than five years' duration.

(vi) Persons who have passed through a course of study of not less than five years' duration in a foreign country and are entitled to practise in that country and who pass an examination prescribed by the Senate of the University of Sydney.

No person who is a German or Austrian subject or who possesses a German or Austrian degree only, can be registered.

Victoria.

(i) Graduates of Australian universities.

(ii) Persons who have passed through a course of study of not less than five years' duration in a British university, college or in any foreign university, college or body recognized in that country and who possess a diploma or degree entitling them to practise in that country, provided that the same arrangements obtain in that country for graduates of the University of Melbourne.

(iii) One person holding the qualifications of the Boston Homœopathic University and College or of the New York Homœopathic Medical College and Hospital may be registered each year.

Queensland.

(i) Holders of a degree in medicine or surgery of any university in the Commonwealth of Australia or the Dominion of New Zealand which is legally authorized to grant such degree.

(ii) Persons who are registered or possess a qualification entitling them to be registered under the medical acts of the Parliament of the United Kingdom or any act amending or substituted for those acts or any of them.

(iii) Persons who have passed through a regular course of medical study of not less than five years' duration in a school of medicine, and who have received after due examination from some university, college or other body duly recognized for that purpose in the country to which such university or other body belongs, a diploma, degree or licence entitling them to practise medicine in that country.

The Act provides that the Board may refuse to register any person holding a qualification entitling him to practise in the country or state where such qualification was granted, if the Board is satisfied that under the laws, rules or usages of such country or state medical practitioners, duly qualified to practise in the United Kingdom of Great Britain and Ireland or in any part of His Majesty's Dominions, are not permitted to practise in such country or state.

Every medical practitioner on changing his place of abode is required to notify the fact by post to the Registrar. The Registrar may post a notice to any medical practitioner according to his address in the register inquiring whether he has changed his address or residence and if no answer is returned to such notice within six months after the posting thereof, the Board may erase the name of the practitioner from the register.

South Australia.

(i) Graduates of a university in Australia or New Zealand.

(ii) Persons registered or entitled to be registered in the United Kingdom.

(iii) Persons who have passed through a course of study of five years' duration in a foreign country, provided that the standard is not lower than that recognized in South Australia and who have received a degree or diploma and are entitled to be registered in that country, provided that equal rights are granted in that country to persons registered under the South Australian Act.

Western Australia.

(i) Persons registered under *The Medical Ordinance* of 1869.

(ii) Persons who hold any one or more of the qualifications in the second schedule and whose diplomas, licences, certificates or other documents were obtained from some university, college or other body recognized for the purpose in the country to which such body belongs.

The person making application for registration must be of good fame and character and be entitled to practise under the qualification by virtue of which he applies to be so registered in the place where the same was granted.

The schedule to which reference is made, contains the following list: Fellow, member or licentiate of the Royal College of Physicians of London, of the Royal College of Physicians of Edinburgh, of the King and Queen's College of Physicians of Ireland, of the Royal College of Surgeons of England, of the Royal College of Surgeons of Edinburgh, of the Faculty of Physicians and Surgeons of Glasgow, of the Royal College of Surgeons of Ireland, licentiate of the Society of Apothecaries of London, of the Apothecaries' Hall, Dublin, doctor or bachelor of medicine or master or bachelor of surgery of some British or Colonial university.

(iii) Any legally qualified practitioner registered in the United Kingdom under any Act or Acts of the Parliament of the United Kingdom of Great Britain and Ireland. Medical officers duly appointed and confirmed of His Majesty's sea or land service. Any person who shall prove to the satisfaction of the Board that he has passed through a regular course of medical study of not less than three years' duration in a British or foreign school of medicine and has received after due examination from some British or foreign university, college, or body duly recognized for that purpose in the country to which such university, college, or other body may belong, a medical diploma or degree certifying to his ability to practise medicine or surgery, as the case may be.

Tasmania.

(i) Graduates of all British universities.

(ii) Persons entitled to be registered in the United Kingdom.

(iii) Persons who are medical officers in His Majesty's sea or land services.

(iv) Graduates of a medical college of Class "A" in one of the States of America, provided that they have passed through a course of study of four years' duration and have received a degree or diploma from that college and provided that they hold a certificate or licence entitling them to practise in one of the States of America.

Medical Students' Societies.

THE medical student fresh from school is like a young colt set free in a paddock after weeks of detention in the stable yard. He is apt to career about wildly and to kick his heels in the air. If he is fortunate enough to go into residence in one of the university colleges, he can enjoy fun and frolic that are denied to the home student. In any case he is responsible for his share and probably more than his share of the nonsense that is associated by tradition with student life and who would have it otherwise? The healthy student takes his part in all the activities of the university. As a rule no effort is required to make him take an interest in sport, but very often he does not see the good of joining the medical students' society. It may be that the teaching staff does not set out the advantages of such societies to the younger students. After graduation the man who wishes to keep himself abreast of the times and to contribute his share to the common fund of knowledge, naturally turns to medical associations and societies. He will be much more at home if he has formed the medical society habit during his student days. He will learn at his student meetings the value of frank discussion, the method of presentation of a report and how to conduct himself in debate. He may learn what many do not know—that silence is often golden and that a man is foolish to rise to speak unless he has something to say.

Each of the Australian universities possesses a healthy and active student society. Each of these societies has its own journal and these journals are edited by undergraduates. At least one of these journals has a professor as its censor. His censorship is not particularly strict and thereupon he should be congratulated, for if it be argued that medical students should take part in all the activities of student life, it may equally well be held that the students' journal should reflect every phase of student thought, of course, in moderation.

The Sydney University Medical Society was founded in 1886 by the late Thomas Anderson Stuart to be a meeting ground for teachers, graduates and undergraduates. Meetings are held at regular intervals and at these meetings papers are read and discussions held. *The Sydney University Medical Journal* is published once a term. It is produced by an editor and two assistants all of whom are undergraduates. All graduates and undergraduates of the Medical School are eligible for membership of the Society, as also are all medical practitioners whose qualifications are recognized by the University of Sydney. Senior undergraduates pay a subscription of seven shillings and sixpence a year and junior undergraduates pay five shillings. Graduates may become life members on payment of one guinea and for another guinea they receive the journal for four years.

The Medical Society of the University of Melbourne was founded to promote an *esprit de corps* among the undergraduates, to serve other means of advancing their knowledge and to further their interest generally.

The official organ of the Society is *The Speculum*. It is neither too respectable nor too depraved and fulfils its purpose admirably. The subscription to the Society is five shillings a year. The members at an annual meeting may enrol as a life member any member or medical practitioner who pays the sum of five guineas. The president and vice-president are required to be members of the Victorian Branch of the British Medical Association.

The Adelaide Medical Students' Society was founded in 1889 in order "to further the interests

of medical work among students and to provide intercourse amongst its members." Undergraduates pay a subscription of ten shillings a year and graduates of the University of Adelaide or of any other recognized university pay five shillings a year. Life membership is granted on the payment of three guineas. *The Adelaide Medical Students' Review* is the official organ of the society. Like its sister productions it well repays perusal. It is a judicious mixture of grave and gay and reflects credit on those who conspire to produce it.

Obituary.

PERCIVAL JAMES CAMPBELL.

WE regret to announce the death of Dr. Percival James Campbell which occurred at Trafalgar, Victoria, on November 26, 1928.

Medical Appointments.

Dr. Charles G. Berge (B.M.A.) has been appointed Eye Specialist to the Mental Hospital, Parramatta, New South Wales.

* * *

Dr. Arthur L. Clowes (B.M.A.) has been appointed Ear, Nose and Throat Specialist to the Mental Hospital, Parramatta, New South Wales.

* * *

Dr. Reginald E. Nowland (B.M.A.) has been appointed Honorary Surgeon, Mental Hospital, Callan Park, New South Wales.

* * *

Dr. Richard Sanders Rogers (B.M.A.) has been appointed to the Board of Governors of the Public Library, Museum and Art Gallery of South Australia.

* * *

Dr. Harold Mitchell Rees (B.M.A.) has been appointed to be a Member of the Medical Board of South Australia, under the provisions of the *Workmen's Compensation Act Amendment Act*, 1927.

* * *

Dr. William Roy Angus (B.M.A.) has been appointed Officer of Health for the hundred of Curramulka, South Australia.

Diary for the Month.

DEC. 11.—Tasmanian Branch, B.M.A.: Branch.
DEC. 11.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
DEC. 13.—Victorian Branch, B.M.A.: Council.
DEC. 14.—Queensland Branch, B.M.A.: Branch (Annual Meeting).
DEC. 17.—New South Wales Branch, B.M.A.: Organization and Science Committee.
DEC. 18.—Tasmanian Branch, B.M.A.: Council.
DEC. 18.—New South Wales Branch, B.M.A.: Medical Politics Committee.
DEC. 19.—Central Northern Medical Association, New South Wales.
DEC. 21.—Queensland Branch, B.M.A.: Council.

Medical Appointments Vacant, etc.

FOR announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xx.

LAUNCESTON PUBLIC HOSPITAL: Junior Resident Medical Officer (Male).
MANLY COTTAGE HOSPITAL, NEW SOUTH WALES: Resident Medical Officer.
ROCKHAMPTON HOSPITALS BOARD: Resident Medical Officer.
RENWICK HOSPITAL FOR INFANTS, SUMMER HILL: Medical Superintendent.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham Dispensary. Manchester United Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Members accepting appointments as medical officers of country hospitals in Queensland are advised to submit a copy of their agreement to the Council before signing. Brisbane United Friendly Society Institute. Stannary Hills Hospital.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Contract Practice Appointments in South Australia. Booleroo Centre Medical Club.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Medical practitioners are requested not to apply for appointments to position at the Hobart General Hospital, Tasmania, without first having communicated with the Editor of THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor," THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, Sydney. (Telephones: MW 2651-2.)

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